DESCRIPTIONS OF SYSTEMS, MAPPING SUBSYSTEMS, AND VEGETATION TYPES FOR OKLAHOMA

Lee F. Elliott
4 June 2015

The following descriptions cover the systems that have been identified for the legend for Oklahoma in support of the project seeking to map the Ecological Systems for the Oklahoma Department of Wildlife Conservation. Many of these descriptions were drafted from System descriptions available from NatureServe (http://www.natureserve.org/explorer/). Most System descriptions were modified, and all Vegetation Type descriptions were generated from discussions regarding these cover types. These brief narratives generally focus on 'typical' type concepts, and mapped vegetation types often circumscribe more variation on the ground than what is described here. For each system, a number of cover types, or "Vegetation Types" were described. A common name is given for each Vegetation Type, and this name is used in the table of contents and for the map legend. Additionally, a second name is provided which more directly ties the Vegetation Type to the system of which it is a part. A numeric identifier is also provided. This identifier represents the identifier used by NatureServe for the system. For the Vegetation Type, a digit suffix is provided to distinguish the various cover types within the system. In parenthesis directly following the common name of the Vegetation Type, a number is provided. This number represents the numeric code used to track the Vegetation Types during the mapping process. Numerous documents, many authored or co-authored by Bruce Hoagland, were consulted while developing these descriptions, but Hoagland (2000) was of particular importance during the process.

Recommended citation: Elliott, L. F. 2015. Descriptions of Systems, Mapping Subsystems, and Vegetation Types for Oklahoma. Report to Oklahoma Department of Wildlife Conservation. 69 pp.

TABLE OF CONTENTS

Forests, Woodlands and Savannas

Crosstimbers Oak Forest and Woodland
Identifier: CES205.682

Geology: This system occurs over a large region of central Oklahoma, primarily underlain by Pennsylvanian sandstone, shale, and some limestone formations to the east, and on sandstone, shale and some gypsum formations of Permian age to the west. Sedimentary formations generally form north-south trending bands, and ridges and cuestas follow similar trends, especially to the east.

Landform: Gently rolling, moderately dissected uplands, and irregular plains becoming more rugged to the north and portions of the western distribution of this system. River valleys generally trend west to east or northwest to southeast.

Soils: Sands or sandy loams, some with a claypan, are characteristic of this system. Ecological Sites typical of the eastern expressions include Sandy Savannah, Shallow Savannah, Deep Sand Savannah, and Claypan Prairie. Primarily on Ustalf soils that range from shallow to moderately deep.

Description: This system is generally described as a savanna or woodland dominated by *Quercus stellata* (post oak) and/or *Quercus marilandica* (blackjack oak) with an interspersion of pasture or native prairie. *Juniperus virginiana* (eastern redcedar) is often encountered, sometimes indicating disturbance, but also occurring on shallow-soiled sites and ridges where populations may be stable. Other species in the canopy may include *Carya texana* (black hickory), *Ulmus alata* (winged elm), *Quercus velutina* (black oak), and *Celtis laevigata* (sugar hackberry). On mesic slopes, species such as *Quercus shumardii* (Shumard oak), *Quercus muehlenbergii* (chinkapin oak), and *Fraxinus* spp. (ashes) may sometimes be important components of the canopy. The shrub layer may contain young components of the overstory, but may also include species such as *Symphoricarpos orbiculatus* (coralberry), *Cercis canadensis* (eastern redbud), *Cornus drummondii* (roughleaf dogwood), and *Sideroxylon lanuginosum* (gum bumelia). Shrub patches dominated by *Rhus glabra* (smooth sumac) or *Rhus copallinum* (winged sumac) may also be present. Vines such as *Smilax bona-nox* (saw greenbrier), *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (poison ivy), and *Vitis* spp. (grapes) are commonly encountered. The understory may have been historically dominated by *Schizachyrium scoparium* (little bluestem), but current understory composition may be largely determined by land use history and grazing pressure. In the east, where precipitation is greater, tallgrass species such as *Andropogon gerardii* (big bluestem) and *Sorghastrum nutans* (Indiangrass) may have been important components of the understory, or occupy prairie patches. In the current landscape, grassland patches tend to be dominated by non-native species such as *Cynodon dactylon* (Bermudagrass), *Bromus arvensis* (Japanese brome), *Schedonorus arundinaceus* (tall fescue), and *Bothriochloa ischaemum* var. *songarica* (yellow bluestem); with forbs such as *Ambrosia psilostachya* (western ragweed), *Amphiachyris dracunculoides* (prairie broomweed), and *Helenium amarum* (sneezeweed) frequently encountered. Though some patches, and the herbaceous layer of the sometimes open woodlands and savannas, may have species such as *Schizachyrium scoparium* (little bluestem), *Bothriochloa laguroides* ssp. *torreyana* (silver

bluestem), *Panicum virgatum* (switchgrass), *Elymus canadensis* (Canada wildrye), *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (yellow Indiangrass), *Danthonia spicata* (poverty oatgrass), and *Tridens flavus* (purpletop tridens).

VEGETATION TYPES:

Crosstimbers: Post Oak – Blackjack Oak Forest and Woodland (504)

Crosstimbers Oak Forest and Woodland
Identifier: CES205.682.4 **MoRAP Code:** 504
Description: This vegetation type represents the typical occurrence dominated by the usual *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak), with other canopy species such as *Carya texana* (black hickory), *Quercus velutina* (black oak), *Ulmus alata* (winged elm), *Quercus shumardii* (Shumard oak), and *Juniperus virginiana* (eastern redcedar). The overstory may be relatively closed, resulting in reduced herbaceous cover. Some occurrences may have significant cover in the shrub layer with young species from the overstory as well as species such as *Symphoricarpos orbiculatus* (coralberry), *Cercis canadensis* (eastern redbud), and/or *Sideroxylon lanuginosum* (gum bumelia). *Smilax bona-nox* (saw greenbrier), *Toxicodendron radicans* (poison ivy), and *Vitis* spp. (grapes) are commonly encountered vines. Grass species, particularly *Schizachyrium scoparium* (little bluestem), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), and/or *Elymus canadensis* (Canada wildrye) may be present in the understory, and may form prairie openings in the woodland.

Crosstimbers: Pasture / Prairie (507)

Crosstimbers Pasture / Prairie
Identifier: CES205.682.7 **MoRAP Code:** 507
Description: This is a primarily herbaceous vegetation type, representing the graminoid dominated component of the system. Occurrences are often dependent on appropriate land management (such as prescribed fire and/or brush control) that ensures reduced woody cover. Woody canopy represents less than 25% cover. Historically, *Schizachyrium scoparium* (little bluestem) likely dominated these grasslands, but current composition may be largely determined by land use history and grazing pressure. In the east, where precipitation is greater, tallgrass species such as *Andropogon gerardii* (big bluestem) and *Sorghastrum nutans* (Indiangrass) may have been, and in places still are, important components. In the current landscape, occurrences tend to be dominated by non-native species such as *Cynodon dactylon* (Bermudagrass), *Bromus arvensis* (Japanese brome), and *Schedonorus arundinaceus* (tall fescue), with forbs such as *Ambrosia psilostachya* (western ragweed), *Amphiachyris dracunculoides* (annual broomweed), and *Helenium amarum* (bitterweed) often conspicuous. Species such as *Schizachyrium scoparium* (little bluestem) and *Bothriochloa laguroides* spp. *torreyana* (silver bluestem) may be conspicuous or dominant, and species such as *Panicum virgatum* (switchgrass), *Tridens strictus* (longspike tridens), *Andropogon gerardii* (big bluestem), and *Sorghastrum nutans* (yellow Indiangrass) may also be prominent.

Crosstimbers: Eastern Redcedar Woodland and Shrubland (515)

Crosstimbers Eastern Redcedar Woodland and Shrubland
Identifier: CES205.682.15 **MoRAP Code:** 515
Description: The canopy of the type is usually dominated by *Juniperus virginiana* (eastern redcedar), either in the overstory or as a shrub. Deciduous species such as *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak) may be present to subdominant. Some occurrences may be a reflection of past disturbance.

Crosstimbers: Post Oak – Eastern Redcedar Forest and Woodland (503)

Crosstimbers Oak – Eastern Redcedar Forest and Woodland
Identifier: CES205.682.3 **MoRAP Code:** 503
Description: Sites are co-dominated by *Juniperus virginiana* (eastern redcedar) and *Quercus* species (oaks). Some such sites are thought to result from disruption in the fire regime and/or anthropogenic disturbance. *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak) are the most frequently encountered co-dominants in the canopy. The dense canopy cover by cedars often results in limited light penetration and the consequent reduction in herbaceous cover.

Crosstimbers: Eastern Redcedar Slope Woodland and Shrubland (525)

Crosstimbers Eastern Redcedar Slope Woodland and Shrubland
Identifier: CES206.682.25 **MoRAP Code:** 521
Description: This component of the system, occupying slopes greater than twenty percent, is dominated by *Juniperus virginiana* (eastern redcedar). It may occur as either woodlands or shrublands.

Crosstimbers: Post Oak – Eastern Redcedar Slope Forest (523)

Crosstimbers Deciduous - Eastern Redcedar Slope Forest
Identifier: CES206.682.23 **MoRAP Code:** 523
Description: Forests occupying slopes greater than twenty percent with canopies co-dominated by deciduous hardwood species and *Juniperus virginiana* (eastern redcedar). Hardwood components include *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya texana* (black hickory), *Quercus velutina* (black oak), and *Quercus shumardii* (Shumard oak). The overstory canopy tends to be more closed than upland counterparts, and shrub and herbaceous cover is consequently reduced.

Crosstimbers: Oak - Hardwood Slope Forest (524)

Crosstimbers Deciduous Slope Forest
Identifier: CES206.682.24 **MoRAP Code:** 524
Description: These relatively closed canopy forests on slopes (greater than twenty percent) are dominated in the overstory by deciduous species, primarily oaks such as *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Quercus velutina* (black oak), and *Quercus shumardii* (Shumard oak). *Carya texana* (black hickory), *Quercus macrocarpa* (bur oak), *Fraxinus* spp. (ashes), *Quercus muehlenbergii* (chinkapin oak), *Celtis laevigata* (sugar hackberry), *Ulmus alata* (winged elm), and/or *Sideroxylon lanuginosum* (gum bumelia) may also be present in the canopy. Occurrences may

resemble **Ozark-Ouachita Dry-Mesic Oak Forest (CES202.708)** and are present as far west as the Flint Hills.

Crosstimbers: Young Post Oak – Blackjack Oak Woodland (506)

Crosstimbers Young Post Oak – Blackjack Oak Woodland
Identifier: CES205.682.6 **MoRAP Code:** 506
Description: This vegetation type may present as a woodland recovering from a recent disturbance, with young *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), and *Carya texana* (black hickory) common. There may be a sparse overstory, or these species may be present in the shrub layer. Other woody species include *Juniperus virginiana* (eastern redcedar), *Ulmus alata* (winged elm), *Celtis laevigata* (sugar hackberry), *Sideroxylon lanuginosum* (gum bumelia), *Cornus drummondii* (roughleaf dogwood), *Cercis canadensis* (eastern redbud), and/or *Symphoricarpos orbiculatus* (coralberry). Shrublands dominated by species such as *Rhus glabra* (smooth sumac) may also be mapped as this type.

Crosstimbers: Sandyland Post Oak – Blackjack Oak Forest and Woodland (534)

Crosstimbers Sandyland Oak Woodland
Identifier: CES205.682.34 **MoRAP Code:** 534
Description: This vegetation type represents system occurrences that occupy particularly sandy sites (typically Deep Sand, Sand Hill, and perhaps some Sandy ecoclasses), sometimes associated with alluvial or aeolian deposits. These sites are likely dominated by *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), and *Carya texana* (black hickory).

Crosstimbers: Sandyland Shrubland and Grassland (526)

Crosstimbers Sandyland Shrubland and Grassland
Identifier: CES205.682.26 **MoRAP Code:** 526
Description: This vegetation type occurs on particularly sandy sites (typically Deep Sand, Sand Hill, and perhaps some Sandy ecoclasses). Occurrences may represent young stands, or may be maintained as primarily herbaceous or shrubland due to the xeric edaphic condition.

Southern Rocky Mountain Pinyon – Juniper Woodland

Identifier: CES306.835

Geology: This system is primarily associated with Dakota Sandstone, and the Morrison and Purgatoire Formations, along with the characteristic Raton Basalt at the highest elevations. The Ogallala Formation, underlying much of the Oklahoma panhandle is also present in the region.

Landform: This is the Mesa de Maya region, or Black Mesa in Oklahoma, and is characterized by shallow, flat-topped mesas with steep rocky escarpment slopes.

Soils: Soils are mostly shallow and rocky. The ecoclasses Malpais Breaks and Shallow Sandstone are characteristic of the system.

Description: This system represents the most conspicuous coniferous evergreen dominated vegetation in the western portion of the Oklahoma panhandle. *Juniperus monosperma* (oneseed juniper) and *Pinus edulis* (two-needle pinyon) are the dominants of the canopy and usually occur as low woodland. Other woody associates include *Cercocarpus montanus* (mountain mahogany), *Quercus gambelii* (Gambel oak), and *Rhus aromatica* (fragrant sumac). *Opuntia phaeacantha* (tulip pricklypear), *Cylindropuntia imbricata* (tree cholla), and *Yucca glauca* (soapweed yucca) may be conspicuous. *Prosopis glandulosa* (honey mesquite) may also be encountered. Common herbaceous components may include *Bouteloua curtipendula* (sideoats grama), *Bouteloua gracilis* (blue grama), *Sporobolus cryptandrus* (sand dropseed), *Bouteloua hirsuta* (hairy grama), and *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem). *Pinus edulis* (two-needle pinyon) is a less conspicuous element of occurrences making these occurrences within Oklahoma possibly more closely approximating Southern Rocky Mountain Juniper Woodland and Savanna CES306.834

VEGETATION TYPES:

Black Mesa: Pinyon – Juniper Woodland (15201)

Southern Rocky Mountain Pinyon – Juniper Woodland
Identifier: CES306.835.1 **MoRAP Code:** 15201
Description: Occurrences of the system with higher stature, forming a woodland dominated by *Juniperus monosperma* (oneseed juniper), often with scattered *Pinus edulis* (two-needle pinyon).

Black Mesa: Pinyon – Juniper Shrubland (15205)

Southern Rocky Mountain Pinyon – Juniper Woodland
Identifier: CES306.835.5 **MoRAP Code:** 15205
Description: Occurrences of lower stature, forming a shrubland, sometimes with emergent individuals of the dominant *Juniperus monosperma* (oneseed juniper) and scattered *Pinus edulis* (two-needle pinyon).

Ozark – Ouachita Dry Oak Woodland
Identifier: CES202.707

Geology: This system is most often associated with various Paleozoic sedimentary formations of the eastern portion of Oklahoma. These formations include limestones and cherty limestones, as well as shales, dolomites, and sandstones.
Landform: Gently rolling to strongly dissected landforms, where ridge tops and upper topographic positions are well-drained and dry.
Soils: The Smooth Chert Savannah is the most characteristic ecoclass for the system, though it is also associated with Edgerock, Sandy Savannah, and Savannah Breaks.

Description: This system occurs in the Ozark and Ouachita Mountains of eastern Oklahoma on ridge tops and over bluff escarpments. Parent material can range from calcareous to acidic, with very shallow, well- to excessively well-drained soils. *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya texana* (black hickory) and *Quercus velutina* (black oak) are common dominants. *Pinus echinata* (shortleaf pine), *Quercus alba* (white oak), and *Carya tomentosa* (mockernut hickory) may also be conspicuous in the canopy. The shrub layer varies, sometimes presenting as an open understory with young members of the canopy and small trees such as *Cornus florida* (flowering dogwood), *Cercis canadensis* (eastern redbud), and *Ulmus alata* (winged elm) in the subcanopy. Other shrubs that may be present include *Symphoricarpos orbiculatus* (coralberry), *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), *Amelanchier arborea* (common serviceberry), and *Viburnum rufidulum* (rusty blackhaw). The herbaceous layer is often patchy and dominated by graminoids such as *Schizachyrium scoparium* (little bluestem), *Danthonia spicata* (poverty oatgrass), and *Dichanthelium* spp. (rosette grasses). Forbs such as *Helianthus hirsutus* (hairy sunflower), *Solidago ulmifolia* (elmleaf goldenrod), *Antennaria parlinii* (Parlin's pussytoes), and *Symphyotrichum* spp. (asters) may also be present in the understory.

VEGETATION TYPES:

Ozark-Ouachita: Dry Oak Woodland (13104)

Ozark-Ouachita Dry Oak Woodland
Identifier: CES202.707.4 **MoRAP Code:** 13104
Description: This type is the typical expression of the system dominated by species such as *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya texana* (black hickory), and *Quercus velutina* (black oak).

Ozark-Ouachita: Dry Mixed Oak – Evergreen Woodland (13103)

Ozark-Ouachita Dry Mixed Oak - Evergreen Woodland
Identifier: CES202.707.3 **MoRAP Code:** 13103
Description: This vegetation is dominated by oak – hickory species, but may have significant canopy cover contributed by *Pinus echinata* (shortleaf pine) or *Juniperus virginianum* (eastern redcedar).

Ozark-Ouachita: Dry Oak Woodland Young Regrowth (13106)

Ozark Ouachita Dry Oak Woodland Young Regrowth
Identifier: CES202.707.6 **MoRAP Code:** 13106
Description: This vegetation type represents sites that may be recovering from disturbance and therefore contains young individuals of the typical canopy species. Alternatively, sites may be dominated by shrub species such as *Rhus glabra* (smooth sumac) or *Rhus copallinum* (winged sumac). *Ulmus alata* (winged elm) may form a dense low canopy.

Ozark Ouachita Dry-Mesic Oak Forest
Identifier: CES202.709

Geology: This system occupies the Paleozoic sedimentary formations of eastern Oklahoma, including limestones, cherty limestones, dolomites, shales and sandstones.

Landform: Occurrences occupy slopes and low topographic positions, including benches at the bases of slopes, where moisture accumulation is higher and insolation lower.

Soils: Soils occupied by this system include the ecoclasses Smooth Chert Savannah, Sandy Savannah, Shallow Savannah, and Savannah Breaks, but occurrences occupy protected sites and low topographic position.

Description: These forests occupy gentle to steep slopes of the Ozark and Ouachita regions of eastern Oklahoma. They tend to have a closed canopy and are dominated by species such as *Quercus rubra* (northern red oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Carya tomentosa* (mockernut hickory), and *Quercus stellata* (post oak). Other species commonly encountered in the canopy include *Carya texana* (black hickory), *Acer saccharum* (sugar maple), *Quercus muehlenbergii* (chinkapin oak), *Quercus shumardii* (Shumard oak), *Carya cordiformis* (bitternut hickory), *Quercus falcata* (southern red oak), *Prunus serotina* (black cherry), and *Nyssa sylvatica* (black gum). *Pinus echinata* (shortleaf pine) may be present but not dominant. There may be a relatively sparse subcanopy of overstory species combined with *Cornus florida* (flowering dogwood), *Ostrya virginiana* (hophornbeam), *Ulmus alata* (winged elm), and/or *Cercis canadensis* (eastern redbud). Shrubs including *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium arboreum* (farkleberry), *Vaccinium stramineum* (deerberry), *Lindera benzoin* (spicebush), *Frangula caroliniana* (Carolina buckthorn), and *Viburnum rufidulum* (rusty blackhaw) may be present. The herbaceous layer is generally not well-developed, but may include species such as *Danthonia spicata* (poverty oatgrass), *Schizachyrium scoparium* (little bluestem), *Desmodium glutinosum* (pointedleaf ticktrefoil), *Myosotis verna* (spring forget-me-not), *Solidago ulmifolia* (elmleaf goldenrod), and *Helianthus hirsutus* (hairy sunflower).

VEGETATION TYPES:

Ozark-Ouachita: Dry-Mesic Oak Forest (13004)

Ozark-Ouachita Dry-Mesic Oak Forest
Identifier: CES202.709.4 **MoRAP Code:** 13004
Description: Oak and hickory dominated forest with canopy dominated by species such as *Quercus rubra* (northern red oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Carya tomentosa* (mockernut hickory), and *Quercus stellata* (post oak).

Ozark-Ouachita: Dry-Mesic Mixed Oak – Evergreen Forest (13003)

Ozark-Ouachita Dry-Mesic Mixed Oak - Evergreen Forest
Identifier: CES202.709.3 **MoRAP Code:** 13003
Description: This vegetation type is like the completely deciduous variant of the system, but also has a significant evergreen component to the canopy or understory, including *Pinus echinata* (shortleaf pine) or *Juniperus virginiana* (eastern redcedar).

Ozark-Ouachita: Dry-Mesic Oak Woodland Young Regrowth (13006)

Ozark-Ouachita Dry-Mesic Oak Forest Regrowth

Identifier: CES202.709.3 **MoRAP Code:** 13006
Description: This type represents occurrences of the system that are in the process of recovering from disturbance and contain young individuals of the canopy species, but may also have a better developed herbaceous layer. The low canopy may be more likely to contain species such as *Celtis laevigata* (sugar hackberry), *Ulmus alata* (winged elm), *Prunus serotina* (black cherry), *Diospyros virginiana* (common persimmon), and *Sassafras albidum* (sassafras).

Ozark-Ouachita Shortleaf Pine – Oak Forest
Identifier: CES202.313

Geology: This system occurs on Paleozoic sedimentary formations of eastern Oklahoma, including sandstones and shales, but also on cherty limestones, limestones, and dolomites.
Landform: On ridgetops and rolling uplands as well as steep slopes.
Soils: Particularly well-represented on sandy soils and the Sandy Savannah and Savannah Breaks ecoclasses.

Description: Occurrences of this system are dominated or codominated by *Pinus echinata* (shortleaf pine), along with oak species such as *Quercus stellata* (post oak), *Quercus velutina* (black oak), and *Quercus alba* (white oak). *Quercus falcata* (southern red oak), *Quercus marilandica* (blackjack oak), *Carya tomentosa* (mockernut hickory), and *Carya texana* (black hickory) may also be prominent in the canopy. Canopy composition is largely dictated by topographic conditions. Species in the subcanopy or shrub layer include *Ulmus alata* (winged elm), *Cornus florida* (flowering dogwood), *Ostrya virginiana* (hophornbeam), *Vaccinium arboreum* (farkleberry), *Callicarpa americana* (American beautyberry), and *Symphoricarpos orbiculatus* (coralberry). Herbaceous cover may be composed of species such as *Schizachyrium scoparium* (little bluestem), *Chasmanthium sessiliflorum* (longleaf woodoats), *Solidago ulmifolia* (elmleaf goldenrod), *Solidago nemoralis* (gray goldenrod), *Danthonia spicata* (poverty oatgrass), *Helianthus hirsutus* (hairy sunflower), and *Dichanthelium* spp. (rosette grasses).

VEGETATION TYPE:

Ozark-Ouachita Shortleaf Pine – Oak Forest (13403)
Ozark-Ouachita Shortleaf Pine – Oak Forest
Identifier: CES202.313.3 **MoRAP Code:** 13403
Description: As described for system.

Ouachita Montane Oak Forest
Identifier: CES202.306

Geology: The system is restricted to the highest exposures of Jackfork Sandstone.

Landform: Ridgetops at high elevations.
Soils: This system occurs on rocky summits in soil complexes including the series Prium, Clebit, and Carnasaw.

Description: Occurrences occupy sites at elevations greater than about 700 m (2300 ft) on Black Fork, Rich, Kiamichi, and Winding Stair Mountains in Latimer and LeFlore counties. The vegetation consists of forests or open woodlands dominated by *Quercus alba* (white oak) with species such as *Quercus stellata* (post oak), *Quercus rubra* (northern red oak), *Quercus marilandica* (blackjack oak), *Carya texana* (black hickory), and *Carya tomentosa* (mockernut hickory) also present. The canopy trees are often stunted due to the effects of ice, wind and cold conditions, in combination with fog, shallow soils over rock, and periodic severe drought. The understory is relatively open, but may be dense on north-facing slopes. Other woody components of the system may include *Vaccinium pallidum* (Blue Ridge blueberry), *Aesculus glabra* (Ohio buckeye), *Hamamelis virginicus* (American witchhazel), *Chionanthus virginicus* (white fringetree), and *Amelanchier arborea* (common serviceberry). *Carex* species such as *Carex pensylvanica* (Pennsylvania sedge) and *Carex ouachitana* (Ouachita Mountain sedge) may be present in the ground layer.

VEGETATION TYPE:

Ozark-Ouachita: Montane Stunted Oak Woodland (13706)

Ouachita Montane Oak Forest
Identifier: CES202.306 **MoRAP Code:** 13706
Description: As described for system.

Ozark-Ouachita Mesic Hardwood Forest (Not Mapped)

Identifier: CES202.043

Description: In Oklahoma, occurrences of this system are best represented in northeastern McCurtain and southeastern LeFlore Counties on protected slopes and along streams. Some sites are dominated by species such as *Fagus grandifolia* (American beech), *Quercus alba* (white oak), *Quercus rubra* (red oak), *Acer saccharum* (sugar maple), *Tilia americana* (American basswood), *Ilex opaca* (American holly), *Nyssa sylvatica* (black gum), and *Liquidambar styraciflua* (sweetgum). Other species encountered include *Cornus florida* (flowering dogwood), *Halesia carolina* (Carolina silverbell), and *Magnolia tripetala* (umbrella-tree).

Ozark-Ouachita Shortleaf Pine – Bluestem Woodland (Not Mapped)

Identifier: CES202.325

Description: This system represents woodland of the Ouachita and Ozark mountains region of Oklahoma in which *Pinus echinata* (shortleaf pine) is the canopy dominant, and the understory is characterized by *Andropogon gerardii* (big bluestem), *Schizachyrium scoparium* (little bluestem), and other prairie plants. In Oklahoma, this system occurs on gently dissected upland cherty plains (in addition to sandstone ridges). The center of distribution is represented in the

northern and western Ouachita Mountains. In the Ouachitas, the system occurs on the northern Hogback Ridges excluding the Novaculite areas to the south. *Pinus echinata* (shortleaf pine) occurs with a variable mixture of hardwood species, with the composition being a function of aspect and topography. This system is primarily confined to gently to moderately sloping, upland plains and is distinguished from the Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland, which occurs on more steeply dissected ridges and steep southwest facing slopes. The abundance of prairie flora also distinguishes this system from the shortleaf pine-oak woodland.

Wichita Mountains Woodland and Shrubland

Identifier: CES

Geology: The system is centered around the Cambrian igneous intrusions of Wichita Granite Group and the Raggedy Mountain Gabbro Group, though it can also be found on the surrounding Permian sedimentary formations.

Landform: Gently rolling and rocky topography with some incised canyons characterize this system.

Soils: The typical ecoclasses occupied by the system includes Boulder Ridge Savannah and Shallow Clay.

Description: Bands of woodlands and shrublands along fractures of the intrusive igneous bedrock characterize the system. *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Juniperus virginiana* (eastern redcedar), and *Celtis laevigata* var. *reticulata* (netleaf hackberry) are common components of the woodlands and shrublands. Some occurrences, especially those to the west may largely lack the oak component. In more mesic areas of valleys and north-facing slopes may be found more mesic woodlands with species such as *Quercus shumardii* (Shumard oak), *Quercus macrocarpa* (bur oak), *Quercus muehlenbergii* (chinkapin oak), *Ulmus americana* (American elm), *Sideroxylon lanuginosum* (gum bumelia), *Juglans microcarpa* (little walnut), *Diospyros virginiana* (common persimmon), and *Acer saccharum* (sugar maple). *Quercus fusiformis* (interior live oak) may be present, but not dominant. Exposed bedrock is often visible. Shrubs may form an understory to the woodland or be present as the upper-most physiognomic layer. Species present in this layer can include species previously mentioned as well as *Rhus trilobata* (skunkbush sumac), *Crataegus* spp. (hawthorns), *Forestiera pubescens* (elbow bush), *Artemisia filifolia* (sand sagebrush), *Ptelea trifoliata* (common hoptree), and *Prosopis glandulosa* (honey mesquite). The herbaceous layer may be well-developed or patchy over the exposed bedrock. Species in this layer include *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), *Bouteloua gracilis* (blue grama), *Andropogon gerardii* (big bluestem), *Bromus tectorum* (cheatgrass), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), and *Bouteloua dactyloides* (buffalograss). Forbs that may be encountered include *Artemisia ludoviciana* (western mugwort), *Thelesperma filifolium* (stiff greenthread), *Ratibida columnifera* (upright prairie coneflower), *Grindelia squarrosa* (curlycup gumweed), *Ambrosia psilostachya* (western ragweed), *Gutierrezia sarothrae* (broom snakeweed), *Eriogonum annuum* (annual buckwheat), and *Symphyotrichum ericoides* (white heath aster). The *Quercus fusiformis – (Quercus stellata) / Schizachyrium scoparium* Granite Woodland (CEGL004937) association is one representation of this system.

VEGETATION TYPES:

Wichita Mountains: Granite Outcrop (14900)

Wichita Mountains Granite Outcrop
Identifier: CES???.???.0 **MoRAP Code:** 14900
Description: Exposed igneous rock, usually granite, with sparse vegetation.

Wichita Mountains: Eastern Redcedar Woodland (14901)

Wichita Mountains Eastern Redcedar Woodland
Identifier: CES???.???.1 **MoRAP Code:** 14901
Description: Occurrences of the system strongly dominated by *Juniperus virginiana* (eastern redcedar) in the canopy.

Wichita Mountains: Oak – Eastern Redcedar Woodland (14903)

Wichita Mountains Oak – Eastern Redcedar Woodland
Identifier: CES???.???.3 **MoRAP Code:** 14903
Description: Mixed woodlands codominated by *Juniperus virginiana* (eastern redcedar) and oaks, usually *Quercus marilandica* (blackjack oak) and/or *Quercus stellata* (post oak). The deciduous component of these woodlands may sometimes be *Celtis laevigata* var. *reticulata* (netleaf hackberry).

Wichita Mountains: Oak Woodland (14904)

Wichita Mountains Oak Woodland
Identifier: ???.???.4 **MoRAP Code:** 14904
Description: Woodland usually dominated by *Quercus marilandica* (blackjack oak) and/or *Quercus stellata* (post oak). Other species that may be conspicuous and sometimes dominant in the canopy include *Celtis laevigata* var. *reticulata* (netleaf hackberry), *Sideroxylon lanuginosum* (gum bumelia), *Ulmus americana* (American elm), *Quercus muehlenbergii* (chinkapin oak). *Quercus fusiformis* (interior live oak) may also be present.

Wichita Mountains: Eastern Redcedar Shrubland (14905)

Wichita Mountains Eastern Redcedar Shrubland
Identifier: ???.???.5 **MoRAP Code:** 14905
Description: Occurrences of the system dominated by *Juniperus virginiana* (eastern redcedar) in the shrub layer. A scattered emergent canopy of *Juniperus virginiana* (eastern redcedar) and/or *Quercus* spp. (oaks) or *Celtis laevigata* var. *reticulata* (netleaf hackberry) may be present.

Wichita Mountains: Low Stature Oak Woodland and Shrubland (14906)

Wichita Mountains Low Stature Oak Woodland and Shrubland
Identifier: ???.???.6 **MoRAP Code:** 14906
Description: Low woodlands to 3 m in height often dominated by *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), and/or *Celtis laevigata* var. *reticulata* (netleaf hackberry). Some occurrences may have significant shrub cover with species

such as *Rhus trilobata* (skunkbush sumac), *Juglans microcarpa* (little walnut), *Sideroxylon lanuginosum* (gum bumelia), *Crataegus* spp. (hawthorns), *Ribes aureum* (golden currant), *Prosopis glandulosa* (honey mesquite), or *Rhus glabra* (smooth sumac).

Wichita Mountains: Eastern Redcedar Slope Woodland (14911)

Wichita Mountains Eastern Redcedar Slope Woodland
Identifier: ???.???.11 **MoRAP Code:** 14911
Description: Slopes greater 20% dominated by *Juniperus virginiana* (eastern redcedar).

Wichita Mountains: Oak – Eastern Redcedar Slope Woodland (14913)

Wichita Mountains Oak – Eastern Redcedar Slope Woodland
Identifier: ???.???.13 **MoRAP Code:** 14913
Description: Slopes greater than 20% that are codominated by *Juniperus virginiana* (eastern redcedar) and *Quercus* spp. (oaks) or *Celtis laevigata* var. *reticulata* (netleaf hackberry).

Wichita Mountains: Oak Slope Woodland (14914)

Wichita Mountains Oak Slope Woodland
Identifier: ???.???.14 **MoRAP Code:** 14914
Description: Slopes greater than 20% that are dominated by *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), and/or *Celtis laevigata* var. *reticulata* (netleaf hackberry). Other species present may include *Sideroxylon lanuginosum* (gum bumelia), *Ulmus americana* (American elm), *Quercus muehlenbergii* (chinkapin oak), or *Quercus fusiformis* (interior live oak).

Wichita Mountains: Low Stature Oak Slope Woodland and Shrubland (14916)

Wichita Mountains Low Stature Oak Slope Woodland and Shrubland
Identifier: ???.???.16 **MoRAP Code:** 14916
Description: Slopes greater than 20% with a deciduous canopy of low stature (~2 m in height). Dominant species usually include *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), and/or *Celtis laevigata* var. *reticulata* (netleaf hackberry). These slopes may sometimes represent shrublands dominated by species such as *Rhus trilobata* (skunkbush sumac), *Juglans microcarpa* (little walnut), *Sideroxylon lanuginosum* (gum bumelia), *Crataegus* spp. (hawthorns), *Prosopis glandulosa* (honey mesquite), or *Rhus glabra* (smooth sumac).

Pleistocene Sands Blackjack Oak Woodland

Identifier:

Geology: Quaternary aeolian and alluvial deep sand deposits along and north of portions of the Canadian, Cimarron, North Canadian, and Salt Fork Arkansas River.
Landform: Rolling and level uplands dissected by drainages to adjacent rivers.
Soils: The system occurs on Deep Sand, Sand Hills, Deep Sand Savannah, and related ecoclasses.

Description: These woodlands are distributed on deep sand deposits along and north of portions of the Canadian, Cimarron, North Canadian, and Salt Fork Arkansas River. Woodlands are dominated by *Quercus marilandica* (blackjack oak), with *Quercus stellata* (post oak) present and sometimes co-dominant in the eastern part of the range of the system. The edaphic character of the system and its westerly distribution strongly influences its composition. The shrub layer may be well-represented and commonly includes species such as *Quercus havardii* (Havard shin oak), *Rhus trilobata* (skunkbush sumac), *Prunus angustifolia* (Chickasaw plum), and *Artemisia filifolia* (sand sagebrush), all indicators of the sandy nature of the substrate. *Juniperus virginiana* (eastern redcedar) commonly shares dominance with *Quercus marilandica* (blackjack oak) in portions of the range. Other canopy species that are often encountered include *Sideroxylon lanuginosum* (gum bumelia), *Sapindus saponaria* var. *drummondii* (western soapberry), *Celtis laevigata* var. *reticulata* (netleaf hackberry), *Ulmus americana* (American elm), and the non-natives *Ulmus pumila* (Siberian elm) and *Robinia pseudoacacia* (black locust). To the west, the system sometimes occurs adjacent to and grades into **Western Great Plains Sandhill Steppe** dominated by *Quercus havardii* (Havard shin oak). The herbaceous layer is variable and can include species such as *Schizachyrium scoparium* (little bluestem), *Andropogon hallii* (sand bluestem), *Sorghastrum nutans* (yellow Indiangrass), *Eragrostis curvula* (weeping lovegrass), *Eriogonum annuum* (annual buckwheat), *Ambrosia psilostachya* (western ragweed), *Aphanostephus skirrhobasis* (Arkansas dozedaisy), *Artemisia ludoviciana* (western mugwort), and *Senecio riddellii* (Riddell's ragwort).

VEGETATION TYPES:

Pleistocene Sands: Blackjack Oak – Eastern Redcedar Woodland (543)

Pleistocene Sands Blackjack Oak Eastern Redcedar Woodland
Identifier: CES???.???.3 **MoRAP Code:** 543
Description: Woodlands codominated by *Quercus marilandica* (blackjack oak) and *Juniperus virginiana* (eastern redcedar), sometimes with significant amounts of *Quercus stellata* (post oak), *Ulmus pumila* (Siberian elm), and/or *Robinia pseudoacacia* (black locust).

Pleistocene Sands: Blackjack Oak Woodland (544)

Pleistocene Sands Blackjack Oak Woodland
Identifier: CES???.???.4 **MoRAP Code:** 544
Description: Woodlands of deep sands often dominated by *Quercus marilandica* (blackjack oak). *Quercus stellata* (post oak), *Sapindus saponaria* var. *drummondii* (western soapberry), *Sideroxylon lanuginosum* (gum bumelia), *Celtis laevigata* var. *reticulata* (netleaf hackberry), *Ulmus americana* (American elm), *Ulmus pumila* (Siberian elm), and/or *Robinia pseudoacacia* (black locust) may also be conspicuous in the canopy.

Edwards Plateau Limestone Savanna and Woodland
Identifier: CES303.660

Geology: Primarily associated with Ordovician and Pennsylvanian limestones and dolomites of the Arbuckle Mountains.
Landform: Ridge tops and rolling uplands of the Arbuckle Mountains.
Soils: Edgerock, Shallow Savannah, and Very Shallow are the ecoclasses most commonly occupied by the system.

Description: As currently recognized, this system represents an outlier of vegetation of the similar limestone plateau, the Edwards Plateau, of central Texas. Woodlands form a mosaic with interspersed grasslands, with some woodlands dominated by coniferous evergreen trees, particularly *Juniperus ashei* (Ashe juniper), and a mix of oak species including *Quercus stellata* (post oak), *Quercus muehlenbergii* (chinkapin oak), *Quercus marilandica* (blackjack oak), and *Quercus velutina* (black oak). Other deciduous trees may include *Ulmus alata* (winged elm), *Celtis laevigata* (sugar hackberry), *Carya texana* (black hickory), and *Fraxinus americana* (white ash). *Juniperus virginiana* (eastern redcedar) may also contribute to the evergreen component of the woodlands. Grasslands included in the mosaic are typically dominated by graminoids including *Schizachyrium scoparium* (little bluestem), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), *Bouteloua curtipendula* (sideoats grama), and *Bouteloua hirsuta* (hairy grama). Forbs including *Liatris punctata* (dotted blazing star), *Gaillardia pulchella* (Indian blanket), *Amphiachyris dracunculoides* (prairie broomweed), and *Heliotropium tenellum* (pasture heliotrope) are also frequently encountered. In the current landscape, grasslands are frequently dominated by non-native species such as *Bromus arvensis* (Japanese brome), *Cynodon dactylon* (Bermudagrass), and *Schedonorus arundinaceus* (tall fescue).

VEGETATION TYPES:

Arbuckle: Ashe Juniper Woodland (1101)

Edwards Plateau Limestone Ashe Juniper Woodland
Identifier: CES303.660.1 **MoRAP Code:** 1101
Description: Woodlands dominated by *Juniperus ashei* (Ashe juniper).

Arbuckle: Oak – Juniper Woodland (1103)

Edwards Plateau Limestone Oak – Ashe Juniper Woodland
Identifier: CES303.660.3 **MoRAP Code:** 1103
Description: Woodlands dominated by a mix of *Juniperus ashei* (Ashe juniper) and oaks such as *Quercus stellata* (post oak), *Quercus muehlenbergii* (chinkapin oak), *Quercus marilandica* (blackjack oak), and *Quercus velutina* (black oak). Other species contributing to the deciduous canopy may include *Celtis laevigata* (sugar hackberry), *Ulmus alata* (winged elm), and *Carya texana* (black hickory).

Arbuckle: Prairie/Pasture (1107)

Edwards Plateau Limestone Grassland
Identifier: CES303.660.7 **MoRAP Code:** 1107
Description: Interstitial grasslands forming a mosaic with the intervening woodlands typically dominated by species such as *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), *Bouteloua hirsuta* (hairy grama) and *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem). In the current landscape,

grasslands are frequently dominated by non-native species such as *Bromus arvensis* (Japanese brome), *Cynodon dactylon* (Bermudagrass), and *Schedonorus arundinaceus* (tall fescue).

Arbuckle: Oak Woodland (1104)

Edwards Plateau Limestone Post Oak Woodland
Identifier: CES303.660.4 **MoRAP Code:** 1104
Description: Upland woodlands typically dominated by oak species such as *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Quercus velutina* (black oak), and *Quercus muehlenbergii* (chinkapin oak). Other species that may contribute to the canopy include *Carya texana* (black hickory), *Ulmus alata* (winged elm), and *Celtis laevigata* (sugar hackberry).

Edwards Plateau Dry-Mesic Slope Forest and Woodland
Identifier: CES303.656

Geology: Primarily associated with Ordovician and Pennsylvanian limestones and dolomites of the Arbuckle Mountains.
Landform: Slopes and lower topographic positions of the more rugged portions of the Arbuckle Mountains.
Soils: Edgerock, Shallow Savannah, and Very Shallow are the ecoclasses most commonly occupied by the system.

Description: As currently represented, this system represents disjunct outliers of the vegetation of mesic slopes of the Edwards Plateau in Central Texas. The canopy is typically relatively closed and may be dominated by species such as *Quercus muehlenbergii* (chinkapin oak), *Quercus buckleyi* (Buckley's oak), *Quercus velutina* (black oak), *Quercus stellata* (post oak), *Fraxinus texensis* (Texas ash), *Carya cordiformis* (bitternut hickory), and *Quercus shumardii* (Shumard oak). *Juniperus ashei* (Ashe juniper) and *Juniperus virginiana* (eastern redcedar) may also be present in the canopy. The shrub and subcanopy are usually not dense and may contain small individuals of the canopy species, as well as species such as *Cercis canadensis* (eastern redbud), *Sideroxylon lanuginosum* (gum bumelia), *Forestiera pubescens* (elbow bush), and *Rhus aromatica* (fragrant sumac). The herbaceous layer is usually not well-developed, but may contain species such as *Bouteloua curtipendula* (sideoats bluestem), *Bouteloua rigidiseta* (Texas grama), *Bouteloua hirsuta* (hairy grama), *Dichanthelium* spp. (rosette grasses), and *Elymus canadensis* (Canada wildrye).

VEGETATION TYPES:

Arbuckle: Juniper Slope Forest (901)

Edwards Plateau Dry-Mesic Juniper Slope Forest
Identifier: CES303.656.1 **MoRAP Code:** 901
Description: Forests occupying slopes greater than 20% that are dominated by *Juniperus ashei* (Ashe juniper) or *Juniperus virginiana* (eastern redcedar).

Arbuckle: Oak – Juniper Slope Forest (903)

Edwards Plateau Dry-Mesic Mixed Oak – Juniper Slope Forest
Identifier: CES303.676.3 **MoRAP Code:** 903
Description: Forests occupying slopes greater than 20% that are dominated by a mix of coniferous evergreen species such as *Juniperus ashei* (Ashe juniper) and *Juniperus virginiana* (eastern redcedar) and deciduous species, including such species as *Quercus muehlenbergii* (chinkapin oak), *Quercus buckleyi* (Buckley's oak), *Quercus velutina* (black oak), *Quercus stellata* (post oak), and *Quercus shumardii* (Shumard oak).

Arbuckle: Oak Slope Forest (904)

Edwards Plateau Dry-Mesic Oak Slope Forest
Identifier: CES303.676.4 **MoRAP Code:** 904
Description: Slope forests dominated by oak species such as *Quercus muehlenbergii* (chinkapin oak), *Quercus buckleyi* (Buckley's oak), *Quercus velutina* (black oak), *Quercus stellata* (post oak), and *Quercus shumardii* (Shumard oak). Other deciduous components of the canopy may include *Fraxinus texensis* (Texas ash), *Celtis laevigata* (sugar hackberry), and *Carya cordiformis* (bitternut hickory).

East-Central Texas Plains Post Oak Savanna and Woodland
Identifier: CES205.679

Geology: Associated with members of the Cretaceous Woodbine Formation west of Muddy Boggy Creek and adjacent formations, sometimes mantled by Quaternary gravel, sand, silt, or clay.
Landform: This system occupies gently rolling, mostly level, to somewhat hilly topography. It is moderately dissected by drainages.
Soils: This system usually occurs on sandy to sandy loam soils, sometimes with a marked clay subsurface horizon. Typical ecoclasses include Sandy Savannah, Claypan Prairie, Loamy Savannah, and Deep Sand Savannah.

Description: This system represents a transition between the woodlands and forest of the West Gulf Coastal Plain and the Post Oak – Blackjack Oak Woodlands of the Crosstimbers. Forests are generally dominated by *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), and *Carya texana* (black hickory), but may have elements such as *Quercus falcata* (southern red oak), *Carya tomentosa* (mockernut hickory), and *Quercus nigra* (water oak) present as well. *Juniperus virginiana* (eastern redcedar) may be common in the canopy or in the understory. Some occurrences may have significant cover in the shrub or subcanopy layer, with species such as *Ulmus alata* (winged elm), *Cornus florida* (flowering dogwood), *Vaccinium arboreum* (farkleberry), *Callicarpa americana* (American beautyberry), *Sideroxylon lanuginosum* (gum bumelia), *Juniperus virginiana* (eastern redcedar), and *Diospyros virginiana* (common persimmon). Grasslands are intermixed with the woodlands, but are often managed pastures and may be dominated by species such as *Cynodon dactylon* (Bermudagrass), *Paspalum dilatatum* (dallisgrass), or *Bothriochloa ischaemum* var. *songarica* (yellow bluestem). Forbs such as *Croton monanthogynus* (prairie tea), *Ambrosia psilostachya* (western ragweed), and

Amphiachyris dracunculoides (prairie broomweed) may be common. Grasslands with native cover may contain species such as *Schizachyrium scoparium* (little bluestem), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), and *Sorghastrum nutans* (yellow Indiangrass).

VEGETATION TYPES:

Post Oak Savanna: Post Oak – Eastern Redcedar Woodland (603)

East-Central Texas Plains Post Oak – Eastern Redcedar Woodland
Identifier: CES205.679.3 **MoRAP Code:** 603
Description: Mixed deciduous and coniferous evergreen woodlands with dominance shared by *Juniperus virginiana* (eastern redcedar) and deciduous species such as *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya texana* (black hickory) as well as other species.

Post Oak Savanna: Post Oak Woodland (604)

East-Central Texas Plains Post Oak Woodland
Identifier: CES205.679.4 **MoRAP Code:** 604
Description: Woodlands dominated by *Quercus stellata* (post oak), as well as species such as *Quercus marilandica* (blackjack oak), *Quercus falcata* (southern red oak), *Quercus nigra* (water oak), *Carya texana* (black hickory), or *Carya tomentosa* (mockernut hickory).

Post Oak Savanna: Young Woodland Regrowth (606)

East-Central Texas Plains Post Oak Young Woodland Regrowth
Identifier: CES205.679.6 **MoRAP Code:** 606
Description: Occurrences following disturbance which are in periods of regrowth. Young individuals of species typical of the system generally dominate the sites, though some areas may be dominated by shrubs such as *Rhus glabra* (smooth sumac) or *Rhus copallinum* (winged sumac) or young *Ulmus alata* (winged elm).

Post Oak Savanna: Pasture/Grassland (607)

East-Central Texas Plains Post Oak Savanna Grassland
Identifier: CES205.679.7 **MoRAP Code:** 607
Description: Grasslands often represent managed pasture and dominated by non-native grasses such as *Cynodon dactylon* (Bermudagrass), *Paspalum dilatatum* (dallisgrass), and *Bothriochloa ischaemum* var. *songarica* (yellow bluestem), and forbs like *Croton monanthogynus* (prairie tea), *Ambrosia psilostachya* (western ragweed), and *Amphiachyris dracunculoides* (prairie broomweed). Native grasslands may have species such as *Schizachyrium scoparium* (little bluestem), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), and *Sorghastrum nutans* (yellow Indiangrass).

Post Oak Savanna: Post Oak – Eastern Redcedar Sandyland Woodland (613)

East-Central Texas Plains Post Oak – Eastern Redcedar Sandyland Woodland
Identifier: CES205.679.13 **MoRAP Code:** 613
Description: Mixed woodlands with *Quercus stellata* (post oak) and *Juniperus virginiana* (eastern redcedar) as dominants and occupying deep sand sites.

Post Oak Savanna: Post Oak Sandyland Woodland (614)

East-Central Texas Plains Post Oak Sandyland Woodland
Identifier: CES205.679.14 **MoRAP Code:** 614
Description: Deep sand sites with a deciduous canopy, usually dominated by *Quercus stellata* (post oak).

Post Oak Savanna: Sandyland Shrubland and Grassland (617)

East-Central Texas Plains Sandyland Shrubland and Grassland
Identifier: CES205.679.17 **MoRAP Code:** 617
Description: Shrublands and grasslands occupying deep sands.

West Gulf Coastal Plain Pine – Hardwood Forest
Identifier: CES203.378

Geology: Formations of Cretaceous age including sandstones, shales, and limestones. Pleistocene terrace deposits mantle large areas.
Landform: Level to rolling topography dissected by drainages with broad valley bottoms.
Soils: Sandy Savannah and Loamy Savannah are typical ecoclasses occupied by this system.

Description: This system forms the matrix of much of the West Gulf Coastal Plain in Oklahoma. Common coniferous dominants in the overstory include *Pinus taeda* (loblolly pine) and/or *Pinus echinata* (shortleaf pine). Deciduous canopy species include *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Quercus nigra* (water oak), *Carya tomentosa* (mockernut hickory), and *Celtis laevigata* (sugar hackberry). *Liquidambar styraciflua* (sweetgum) and *Acer rubrum* (red maple) may also be important components of the canopy or sapling layers. *Juniperus virginiana* (eastern redcedar) may also represent a coniferous evergreen species in the canopy or shrub layer. Shrubs and subcanopy species may include *Vaccinium arboreum* (farkleberry), *Cercis canadensis* (eastern redbud), *Ostrya virginiana* (hophornbeam), *Carpinus caroliniana* (American hornbeam), *Cornus florida* (flowering dogwood), *Callicarpa americana* (American beautyberry), and *Viburnum rufidulum* (rusty blackhaw). The herbaceous layer is usually not well-developed and includes species such as *Schizachyrium scoparium* (little bluestem), *Tridens flavus* (purpletop tridens), *Chasmanthium* spp. (woodoats), and *Rhynchosia latifolia* (prairie snoutbean).

VEGETATION TYPES:

West Gulf Coastal Plain: Pine Forest (3001)

West Gulf Coastal Plain Pine Forest
Identifier: CES203.378.1 **MoRAP Code:** 3001
Description: This vegetation type is dominated by *Pinus taeda* (loblolly pine) and less commonly by *Pinus echinata* (shortleaf pine). *Juniperus virginiana* (eastern redcedar) may be the dominant as opposed to pines.

West Gulf Coastal Plain: Pine – Hardwood Forest (3003)

West Gulf Coastal Plain Pine – Hardwood Forest

Identifier: CES203.378.3 **MoRAP Code:** 3003
Description: Dominated by a mix of pine (*Pinus taeda* (loblolly pine) and/or *Pinus echinata* (shortleaf pine)) and hardwoods. Deciduous canopy species may include *Quercus falcata* (southern red oak), *Quercus alba* (white oak), *Carya tomentosa* (mockernut hickory), *Quercus stellata* (post oak), *Quercus nigra* (water oak), *Liquidambar styraciflua* (sweetgum), and *Celtis laevigata* (sugar hackberry).

West Gulf Coastal Plain: Young Upland Hardwood Woodland Regrowth (3006)

West Gulf Coastal Plain Pine – Hardwood Woodland Regrowth
Identifier: CES203.378.6 **MoRAP Code:** 3006
Description: Young regrowth of forests following disturbance with seedlings and saplings of the common overstory components, often with a preponderance of *Liquidambar styraciflua* (sweetgum), *Acer rubrum* (red maple), *Ulmus alata* (winged elm), or *Celtis laevigata* (sugar hackberry). Some sites may be dominated by shrublands of species such as *Rhus copallinum* (winged sumac), *Rhus glabra* (smooth sumac), or *Baccharis halimifolia* (eastern Baccharis).

West Gulf Coastal Plain: Dry Upland Hardwood Forest (3014)

West Gulf Coastal Plain Dry Hardwood Forest
Identifier: CES203.378.14 **MoRAP Code:** 3014
Description: Ridges and high terraces dominated by deciduous species such as *Quercus falcata* (southern red oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Quercus stellata* (post oak), and *Carya tomentosa* (mockernut hickory). *Pinus* spp. (pines) or *Juniperus virginiana* (eastern redcedar) may be present, but do not codominate the canopy.

West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland
Identifier: CES203.056

Geology: Generally associated with Antlers Sands.
Landform: Ridgetops or slightly higher topographic positions within generally level landscapes.
Soils: This system is restricted to deep sand sites.

Description: This system is of limited distribution and is restricted to deep sand sites and usually has a relatively open wooded canopy. *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya texana* (black hickory), and *Quercus falcata* (southern red oak) are common components. *Quercus incana* (bluejack oak) is uncommon, but is a good indication of the type in the region. *Pinus echinata* (shortleaf pine) is the most common coniferous evergreen encountered, though *Pinus taeda* (loblolly pine) and *Juniperus virginiana* (eastern redcedar) may also be present.

VEGETATION TYPES:

West Gulf Coastal Plain: Sandhill Shortleaf Pine Woodland (3201)

West Gulf Coastal Plain Sandhill Shortleaf Pine Woodland
Identifier: CES203.056.1 **MoRAP Code:** 3201
Description: Occurrences typically dominated by *Pinus echinata* (shortleaf pine).

West Gulf Coastal Plain: Sandhill Oak Woodland (3204)

West Gulf Coastal Plain Sandhill Oak Woodland
Identifier: CES203.056.4 **MoRAP Code:** 3204
Description: Woodlands on deep sands dominated by species such as *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), and/or *Carya texana* (black hickory). *Quercus incana* (bluejack oak), if present, is a good indicator.

West Gulf Coastal Plain Mesic Hardwood Forest (Not Mapped)
Identifier: CES203.280

Description: This system occupies limited upland areas in southeast Oklahoma where mesic topo-edaphic condition prevail. Occurrences are often found in ravines or slopes above perennial streams. Soils are variable and range from coarse to loamy surface texture.

Southern Rocky Mountain Ponderosa Pine Woodland (Not Mapped)
Identifier: CES306.648

Description: Limited in distribution in Oklahoma to upper Tesesquite Canyon in western Cimarron County. It occurs on rocky slopes and sandstone canyons, with a canopy of *Pinus ponderosa* (ponderosa pine). Associated species include *Bouteloua gracilis* (blue grama), *Bouteloua curtipendula* (sideoats grama), *Pleuraphis jamesii* (James' galleta), *Schizachyrium scoparium* (little bluestem), *Melampodium leucanthemum* (plains blackfoot), and *Rhus trilobata* (skunkbush sumac). Occurrences are likely mapped as Southern Rocky Mountain Pinyon – Juniper Woodland (CES306.835).

Shrublands

Edwards Plateau Limestone Shrubland
Identifier: CES303.041

Geology: Associated with Ordovician or Pennsylvanian limestones or dolomites of the Arbuckle Mountains.
Landform: This system may occur on plateaus, or slopes, and may often form a discontinuous band around a plateau edge as it breaks into the adjacent slope.
Soils: Soils are characterized by Edgerock, Breaks, Shallow, and Very Shallow ecoclasses of the Arbuckle region.

Description: As currently described, this shrubland represents a disjunct outlier of the shrublands more commonly encountered on the Edwards Plateau of central Texas. Shrublands may be dominated by deciduous species such as *Quercus sinuata* var. *breviloba* (white shin oak), *Forestiera pubescens* (elbow bush), *Rhus aromatica* (fragrant sumac), *Rhus glabra* (smooth sumac), *Cercis canadensis* (eastern redbud), and *Sideroxylon lanuginosum* (gum bumelia). *Juniperus ashei* (Ashe juniper) or *Juniperus virginiana* (eastern redcedar) may be dominant or co-dominant on the sites. This type may also represent expressions of regrowth of the surrounding woodland. Exposed limestone is commonly visible and the herbaceous layer may include species such as *Bouteloua curtipendula* (sideoats grama), *Bouteloua hirsuta* (hairy grama), *Bouteloua rigidiseta* (Texas grama), and *Schizachyrium scoparium* (little bluestem).

VEGETATION TYPES:

Arbuckle: Ashe Juniper Shrubland (1205)

Edwards Plateau Limestone Ashe Juniper Shrubland
Identifier: CES303.041.5 **MoRAP Code:** 1205
Description: Shrublands on limestone of the Arbuckle Mountains dominated by *Juniperus ashei* (Ashe juniper), or in some cases *Juniperus virginiana* (eastern redcedar).

Arbuckle: Deciduous Shrubland (1206)

Edwards Plateau Limestone Deciduous Shrubland
Identifier: CES303.041.6 **MoRAP Code:** 1206
Description: Shrublands that may be dominated by *Quercus sinuata* var. *breviloba* (white shin oak), *Forestiera pubescens* (elbow bush), *Rhus aromatica* (fragrant sumac), *Rhus glabra* (smooth sumac), *Cercis canadensis* (eastern redbud), and/or *Sideroxylon lanuginosum* (gum bumelia). These sites may also represent regrowth of surrounding deciduous woodlands.

Llano Estacado Caprock Escarpment and Breaks Shrubland and Steppe
Identifier: CES303.725

Geology: Escarpments and dissected sedimentary formations generally of Permian age, some with significant gypsum beds.
Landform: Escarpments, steep slopes and nearby uplands in strongly dissected landscapes.
Soils: Breaks and shallow soil, often with exposed rock and sometimes exposed gypsum.

Description: The name for this system is misleading (resulting from initial characterizations and knowledge of its distribution) and may be more appropriately named **South-Central Permian Breaks and Eroded Plains**. Vegetative cover varies in this system from sparse canopy, with exposed bare ground or bedrock, to relatively continuous canopy of shrub or herbaceous species with sparse emergent canopy species. The system occurs in highly dissected country with escarpments, steep slopes, and adjacent uplands, sometimes with exposed gypsum. Shrub cover can be dominated by *Juniperus virginiana* (eastern redcedar), or especially in areas of gypsum, *Juniperus pinchotii* (redberry juniper). Deciduous shrub cover can include species such as *Quercus mohriana* (Mohr oak), *Prosopis glandulosa* (honey mesquite), *Rhus aromatica* (fragrant sumac), *Rhus trilobata* (skunkbush sumac), *Artemisia filifolia* (sand sagebrush), *Prunus angustifolia* (Chickasaw plum), *Ziziphus obtusifolia* (lotebush), and *Yucca glauca* (soapweed yucca). *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), and *Bouteloua hirsuta* (hairy grama) are grasses commonly encountered. Forbs that may be present include *Thelesperma filifolium* (stiff greenthread), *Artemisia ludoviciana* (western mugwort), *Heterotheca stenophylla* (stiffleaf false goldenaster), *Krameria lanceolata* (trailing krameria), and *Calylophus* spp. (sundrops).

VEGETATION TYPES:

Canyon: Sparsely Vegetated (15000)

South-central Permian Sparsely Vegetated Breaks and Eroded Plains
Identifier: CES303.725.0 **MoRAP Code:** 15000
Description: Areas on escarpments and steeply dissected surroundings with limited vegetative cover.

Canyon: Juniper Shrubland (15005)

South-central Permian Breaks Juniper Shrubland
Identifier: CES303.725.5 **MoRAP Code:** 15005
Description: Shrublands of breaks dominated by *Juniperus virginiana* (eastern redcedar), or sometimes *Juniperus pinchotii* (redberry juniper).

Canyon: Deciduous Shrubland (15006)

South-central Permian Breaks Deciduous Shrubland

Identifier: CES303.725.6 **MoRAP Code:** 15006
Description: Deciduous shrublands along breaks and adjacent uplands dominated by species such as *Quercus mohriana* (Mohr oak), *Rhus trilobata* (skunkbush sumac), *Rhus aromatica* (fragrant sumac), *Artemisia filifolia* (sand sagebrush), *Prunus angustifolia* (Chickasaw plum), *Ziziphus obtusifolia* (lotebush), and/or *Yucca glauca* (soapweed yucca).

Canyon: Grassland (15007)

South-central Permian Breaks Herbaceous Vegetation
Identifier: CES303.725.7 **MoRAP Code:** 15007
Description: Areas of escarpment, breaks, and surrounding uplands often with species such as *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), *Bouteloua hirsuta* (hairy grama), *Thelesperma filifolium* (stiff greenthread), and *Artemisia ludoviciana* (western mugwort).

Canyon: Gyp Sparsely Vegetated (15010)

South-central Permian Sparsely Vegetated Gyp Breaks and Eroded Plains
Identifier: CES303.725.10 **MoRAP Code:** 15010
Description: Areas, often with exposed gypsum, with little vegetative cover.

Canyon: Gyp Juniper Shrubland (15015)

South-central Permian Breaks Gyp Juniper Shrubland
Identifier: CES303.725.15 **MoRAP Code:** 15015
Description: Breaks and canyon escarpments dominated by *Juniperus pinchotii* (redberry juniper) or *Juniperus virginiana* (eastern redcedar).

Canyon: Gyp Deciduous Shrubland (15016)

South-central Permian Gyp Breaks Deciduous Shrubland
Identifier: CES303.725.16 **MoRAP Code:** 15016
Description: Breaks and canyon escarpments often with exposed gypsum dominated by species such as *Ziziphus obtusifolia* (lotebush), *Rhus trilobata* (skunkbush sumac), or other deciduous shrub species.

Canyon: Gyp Grassland (15017)

South-central Permian Gyp Breaks Herbaceous Vegetation
Identifier: CES303.725.17 **MoRAP Code:** 15017
Description: Breaks and canyon escarpment and surrounding uplands, often with exposed gypsum, with herbaceous cover that may include species such as *Heterotheca canescens* (hoary false goldenaster), *Thelesperma megapotamicum* (Navajo tea), *Pediomelum cuspidatum* (largebract Indian breadroot), *Tetraneuris scaposa* (stemmy four-nerve daisy), *Calylophus* spp. (sundrops), *Paronychia jamesii* (James' nailwort), or *Oenothera macrocarpa* (bigfruit evening primrose), though typically not as dominants.

Canyon: Gyp Mesquite Shrubland (15026)

South-central Permian Gyp Breaks Mesquite Shrubland

Identifier: CES303.725.26 **MoRAP Code:** 15026
Description: Shrublands of breaks and canyon escarpments with substrate influenced by gypsum and dominated by *Prosopis glandulosa* (honey mesquite).

Southwest Great Plains Canyon
Identifier: CES303.664

Geology: Primarily associated with escarpments and breaks of the Mesozoic formations of the Black Mesa region, including the Morrison and Purgatoire Formations and Dakota Sandstone. It may also occur in dissected portions of the Tertiary Raton Basalt.
Landform: Highly dissected breaks and canyons.
Soils: Shallow soils and breaks, often with exposed rock. Also, occurs on nearby loams and sandy soils.

Description: This vegetation occupies heavily dissected breaks, rimrock escarpments, and steep canyons, with soils ranging from loams to alluvial to sandy. The vegetation ranges from sparse vegetation with exposed bedrock to shrublands with sparse emergent overstory. *Juniperus monosperma* (oneseed juniper) is a common component, but sites dominated by it are here considered as part of **Southern Rocky Mountain Pinyon – Juniper Woodland (CES306.835)**. Shrublands often contain species such as *Rhus aromatica* (fragrant sumac), *Ptelea trifoliata* (common hoptree), *Yucca glauca* (soapweed yucca), and *Cercocarpus montanus* (mountain mahogany). The grassy understory can be dominated by *Bouteloua curtipendula* (sideoats grama), *Bouteloua hirsuta* (hairy grama), *Bouteloua gracilis* (blue grama), *Pleuraphis jamesii* (James' galleta), and *Sporobolus cryptandrus* (sand dropseed).

VEGETATION TYPES:

High Plains: Canyon Sparsely Vegetated (12700)

Southwestern Great Plains Canyon
Identifier: CES303.664.0 **MoRAP Code:** 12700
Description: Dissected breaks and canyons of the Black Mesa region with sparse vegetation.

High Plains: Canyon Deciduous Shrubland (12706)

Southwestern Great Plains Canyon Deciduous Shrubland
Identifier: CES303.664.6 **MoRAP Code:** 12706
Description: Shrublands of dissected breaks and canyon walls with species such as Shrublands often contain species such as *Rhus aromatica* (fragrant sumac), *Ptelea trifoliata* (common hoptree), *Yucca glauca* (soapweed yucca), and *Cercocarpus montanus* (mountain mahogany). *Juniperus monosperma* (oneseed juniper) is often present.

Rocky Mountain Gambel Oak – Mixed Montane Shrubland
Identifier: CES306.818

Geology: Primarily associated with escarpments and breaks of the Mesozoic formations of the Black Mesa region, including the Morrison and Purgatoire Formations and Dakota Sandstone. It may also occur in dissected portions of the Tertiary Raton Basalt.
Landform: Slopes and usually rocky adjacent uplands.
Soils: Often shallow, sometimes loamy or sandy soils.

Description: These deciduous shrublands and low woodlands may often contain *Quercus gambelii* (Gambel oak) or *Quercus mohriana*. Other shrub species that may be present include *Rhus trilobata* (skunkbush sumac), *Celtis laevigata* var. *reticulata* (netleaf hackberry), *Cercocarpus montanus* (mountain mahogany), and *Juniperus monosperma* (oneseed juniper).

VEGETATION TYPES:

Black Mesa: Deciduous Shrubland and Woodland (15516)
Rocky Mountain Gambel Oak – Mixed Montane Shrubland and Woodland
Identifier: CES306.818 **MoRAP Code:** 15504
Description: As described for system.

Western Great Plains Sandhill Steppe
Identifier: CES303.671

Geology: Aeolian and alluvial deep sands.
Landform: Rolling and level topography, sometimes steep dunes.
Soils: Deep sands and sandy soil.

Description: This system is found on somewhat excessively to excessively well-drained deep sandy soils that are often associated with dune systems and ancient floodplains. In some situations, the system is dominated by dense shrub cover of *Quercus havardii* (Havard shin oak). This may occur in conjunction with patches of **Western Great Plains Sand Prairie (CES303.670)**. Other occurrences may lack *Quercus havardii* (Havard shin oak). *Artemisia filifolia* (sand sagebrush), *Prunus angustifolia* (Chickasaw plum), *Rhus aromatica* (fragrant sumac), and *Yucca glauca* (soapweed yucca) are often present along with *Quercus havardii* (Havard shin oak), or are dominant in its absence. Active, sparsely vegetated dunes may be present. The herbaceous layer may be dense or patchy and may contain species such as *Schizachyrium scoparium* (little bluestem), *Sporobolus cryptandrus* (sand dropseed), *Calamovilfa gigantea* (giant sandreed), *Andropogon hallii* (sand bluestem), *Bouteloua gracilis* (blue grama), and forbs such as *Dimorphocarpa candicans* (Palmer's spectaclepod), *Eriogonum annuum* (annual buckwheat), *Dalea villosa* (silky prairie clover), and *Calylophus serrulatus* (yellow sundrops).

VEGETATION TYPES:

High Plains: Active Sand Dune (2800)

Western Great Plains Sandhill Dune
Identifier: CES303.671.0 **MoRAP Code:** 2800
Description: Sparsely vegetated areas of deep sand.

High Plains: Sandhill Shinnery Shrubland (2806)

Western Great Plains Sandhill Shinnery Steppe
Identifier: CES303.671.6 **MoRAP Code:** 2806
Description: Shrublands often strongly dominated by *Quercus havardii* (Havard shin oak), sometimes with emergent individuals. Individuals of apparent hybrid origin between *Quercus havardii* (Havard shin oak) and *Quercus stellata* (post oak) may be present. Other shrubs that may be present include *Artemisia filifolia* (sand sagebrush), *Rhus aromatica* (fragrant sumac), *Yucca glauca* (soapweed yucca), *Prunus angustifolia* (Chickasaw plum), and *Celtis laevigata* var. *reticulata* (netleaf hackberry). The herbaceous layer is often graminoid dominated, with species such as *Sporobolus cryptandrus* (sand dropseed), *Schizachyrium scoparium* (little bluestem), *Bouteloua gracilis* (blue grama), *Calamovilfa gigantea* (giant sandreed), and *Cenchrus spinifex* (sandbur).

High Plains: Sandhill Shrubland (2826)

Western Great Plains Sandhill Shrubland
Identifier: CES303.671.26 **MoRAP Code:** 2826
Description: Areas of deep sand usually dominated by species such as *Artemisia filifolia* (sand sagebrush), *Rhus aromatica* (fragrant sumac), and/or *Prunus angustifolia* (Chickasaw plum). *Quercus havardii* (Havard shin oak) may be present. Herbaceous canopy may be fairly dense with species such as *Schizachyrium scoparium* (little bluestem), *Andropogon hallii* (sand bluestem), *Bouteloua curtipendula* (sideoats grama), *Bouteloua gracilis* (blue grama), *Sporobolus cryptandrus* (sand dropseed), *Calamovilfa gigantea* (giant sandreed), *Cyperus schweinitzii* (Schweinitz' flatsedge), *Calylophus serrulatus* (yellow sundrops), and *Eriogonum annuum* (annual buckwheat).

High Plains: Sandy Deciduous Shrubland (2805)

Western Great Plains Sandhill Sandy Deciduous Shrubland
Identifier: CES303.671.5 **MoRAP Code:** 2805
Description: Shrublands in the vicinity of deep sands, but occupying sandy soil, often resembling in composition **High Plains: Sandhill Shrubland (2826)**. Deep sand indicators like *Andropogon hallii* (sand bluestem) and *Calamovilfa gigantea* (giant sandreed) are generally lacking.

High Plains: Deep Sand Woodland (2804)

Western Great Plains Sandhill Woodland
Identifier: CES303.671.4 **MoRAP Code:** 2804
Description: Areas of deep sand dominated by woodlands. These woodlands may have species such as *Sapindus saponaria* var. *drummondii* (western soapberry), *Celtis laevigata* var. *reticulata* (netleaf hackberry), and *Ulmus americana* (American elm). Especially near drainages, *Populus deltoides* (eastern cottonwood) may be conspicuous.

Some sites may contain non-natives such as *Ulmus pumila* (Siberian elm) and *Robinia pseudoacacia* (black locust).

Herbaceous Vegetation

Central Mixedgrass Prairie
Identifier: CES303.659

Geology: Occurring on various strata, often of Permian age, but also occupying Quaternary alluvium.
Landform: Occupying a wide range of landforms including low and high flats, rolling topography, and slopes.
Soils: Occupying a wide variety of soils including loam, clay loams, claypan prairie, and sandy soils.

Description: This system is bordered on the east by tallgrass prairie and on the west by shortgrass prairie. It is typically dominated by species such as *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), *Sporobolus cryptandrus* (sand dropseed), *Andropogon gerardii* (big bluestem), and *Bouteloua gracilis* (blue grama). Non-native species such as *Bromus tectorum* (cheatgrass), *Bromus arvensis* (Japanese brome), *Cynodon dactylon* (Bermudagrass), and *Bothriochloa ischaemum* var. *songarica* (yellow bluestem) often dominate occurrences in the current landscape, with forbs such as *Amphiachyris dracunculoides* (prairie broomweed), *Gutierrezia sarothrae* (snake broomweed), *Ambrosia psilostachya* (western ragweed), and *Artemisia ludoviciana* (western mugwort) often encountered. Some occurrences may have some shrub cover with species such as *Yucca glauca* (soapweed yucca), *Prosopis glandulosa* (honey mesquite), *Juniperus virginiana* (eastern redcedar), *Artemisia filifolia* (sand sagebrush), and *Prunus angustifolia* (Chickasaw plum).

VEGETATION TYPES:

Central Mixedgrass: Prairie/Pasture (307)

Central Mixedgrass Prairie
Identifier: CES303.659.7 **MoRAP Code:** 307
Description: Typical pasture and prairie with species such as *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), and *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), but often dominated by non-native species such as *Bromus tectorum* (cheatgrass), *Bromus arvensis* (Japanese brome), and *Cynodon dactylon* (Bermudagrass).

Central Mixedgrass: Sandy Prairie/Pasture (317)

Central Mixedgrass Sandy Prairie
Identifier: CES303.659.17 **MoRAP Code:** 307

Description: Like typical mixedgrass pasture and prairie but occupying sandier soils and more likely to contain species such as *Sporobolus cryptandrus* (sand dropseed), *Cenchrus* spp. (sandburs) and *Eriogonum annuum* (annual buckwheat). Like occurrences off sandy soils, many occurrences are dominated by non-native species.

Southeastern Great Plains Tallgrass Prairie
Identifier: CES205.685

Geology: Often associated with limestone, but also shales and sandstones, generally of Pennsylvanian age. Some Cretaceous limestones to the south may also support occurrences. Quaternary alluvium, terrace deposits, sandy, silty and clayey residuum may also be occupied by the system.
Landform: Cuestas, irregular plains, low rolling hills, and slopes of dissected plains.
Soils: Most often occupying Loamy Prairie, Claypan Prairie, or Shallow Prairie ecoclasses.

Description: Grasslands of the Flint Hills, Osage Cuestas, Cherokee Plains, and to a limited extent, Grand Prairie of southern Oklahoma. These grasslands are often characterized as occurring on thin soils over limestone (sometimes cherty limestone), but may also occupy deeper soils and may occur over other substrates. The Flint Hills contain one of the largest remaining, relatively intact pieces of this tallgrass prairie. The vegetation is graminoid dominated, with species such as *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (yellow Indiangrass), *Panicum virgatum* (switchgrass), *Elymus canadensis* (Canada wildrye), and *Schizachyrium scoparium* (little bluestem). A moderate to high forb density may occur with species such as *Symphyotrichum ericoides* (white heath aster), *Liatris punctata* (dotted blazing star), *Oligoneuron rigidum* (stiff goldenrod), and *Lespedeza capitata* (roundhead lespedeza). Heavily managed or grazed sites may be dominated by non-native species such as *Cynodon dactylon* (Bermudagrass), *Schedonorus arundinaceus* (tall fescue), and *Bromus arvensis* (Japanese brome), with forbs like *Ambrosia psilostachya* (western ragweed), *Amphiachyris dracunculoides* (prairie broomweed), *Lespedeza cuneata* (sericea lespedeza), and *Helenium amarum* (sneezeweed). Shrub and trees species are relatively infrequent, but may include species such as *Juniperus virginiana* (eastern redcedar), *Diospyros virginiana* (common persimmon), *Maclura pomifera* (Osage orange), and *Gleditsia triacanthos* (honey locust). Fire and grazing constitute the major dynamic processes of the system.

VEGETATION TYPES:

Flint Hills: Tallgrass Prairie/Pasture (2017)

Southeastern Great Plains Flint Hills Tallgrass Prairie
Identifier: CES205.685.17 **MoRAP Code:** 2017
Description: Grasslands and pastures of the Flint Hills, west of the Northern Crosstimbers. Intact native grasslands may contain *Andropogon gerardii* (big bluestem), *Panicum virgatum* (switchgrass), *Sorghastrum nutans* (yellow Indiangrass), *Elymus canadensis* (Canada wildrye), and *Schizachyrium scoparium* (little bluestem). Managed and/or heavily grazed occurrences may be dominated by *Schedonorus arundinaceus* (tall fescue) or *Cynodon dactylon* (Bermudagrass).

Osage Plains: Tallgrass Prairie/Pasture (2027)

Southeastern Great Plains Osage Plains Tallgrass Prairie
Identifier: CES205.685.27 **MoRAP Code:** 2027
Description: Grasslands and pastures of the Osage Cuestas and Cherokee Plains, east of the Northern Crosstimbers. Occurrences of this type may be associated with sandstone substrate. Intact native grasslands may contain species such as *Panicum virgatum* (switchgrass), *Andropogon gerardii* (big bluestem), *Schizachyrium scoparium* (little bluestem), and *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem). Managed and/or heavily grazed occurrences are frequently dominated by *Cynodon dactylon* (Bermudagrass) or *Schedonorus arundinaceus* (tall fescue).

Grand Prairie: Prairie/Pasture (2007)

Southeastern Great Plains Tallgrass Grand Prairie
Identifier: CES205.685.7 **MoRAP Code:** 2007
Description: Grasslands and pastures of limited extent over limestone, marls, and shales of Cretaceous age in southern Oklahoma. Intact native occurrences may contain species such as *Andropogon gerardii* (big bluestem), *Schizachyrium scoparium* (little bluestem), and *Sorghastrum nutans* (yellow Indiangrass), but much of the current extent in Oklahoma is dominated by species such as *Cynodon dactylon* (Bermudagrass).

Arkansas Valley Prairie and Woodland

Identifier: CES202.312

Geology: Primarily shales and sandstones of Pennsylvanian age. Quaternary alluvium and terrace deposits are also occupied by the system.
Landform: Undulating plains with scattered hills and ridges.
Soils: Typical ecoclasses occupied by the system include Sandy and Loamy Savannahs.

Description: This system of prairies and associated woodlands occupies the Arkansas River Valley region of eastern Oklahoma and is characterized by broad, level to gently rolling plains. Historically, the system was dominated by tallgrass species such as *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (yellow Indiangrass), *Panicum virgatum* (switchgrass), and *Schizachyrium scoparium* (little bluestem). Few intact occurrences remain and many sites are dominated by non-native species such as *Cynodon dactylon* (Bermudagrass), *Schedonorus arundinaceus* (tall fescue), and *Paspalum dilatatum* (dallisgrass).

VEGETATION TYPES:

Arkansas Valley: Prairie/Pasture (14407)

Arkansas Valley Prairie
Identifier: CES202.312.7 **MoRAP Code:** 14407
Description: As described for the system.

Arkansas Valley: Sandy Prairie/Pasture (14417)

Arkansas Valley Sandy Prairie

Identifier: CES202.312.17 **MoRAP Code:** 14417
Description: A few occurrences occupy deep sands of alluvial or aeolian origin in the region and these occurrences are mapped as a separate type, though information characterizing the type is lacking.

Western Great Plains Shortgrass Prairie
Identifier: CES303.672

Geology: Largely associated with Pliocene and Pleistocene deposits, in particular the Ogallala Formation, and adjacent Quaternary alluvium and residuum.
Landform: Mostly level to gently rolling landscapes.
Soils: Associated with Hardland ecoclasses and loamy, clayey, to sandy soils.

Description: Grasslands of the panhandle and other western counties of Oklahoma. The system grades into **Central Mixedgrass Prairie (CES303.659)** to the east. Turf-forming shortgrasses like *Bouteloua gracilis* (blue grama), *Bouteloua dactyloides* (buffalograss), and *Bouteloua hirsuta* (hairy grama) may dominate occurrences. Other commonly encountered species include *Bouteloua curtipendula* (sideoats grama), *Sporobolus cryptandrus* (sand dropseed), *Panicum obtusum* (vine mesquite), *Aristida oligantha* (prairie threeawn), *Schizachyrium scoparium* (little bluestem), and *Bothriochloa laguroides* var. *torreyana* (silver bluestem). In mesic landscape positions and soils, mid-height grasses may predominate. Forbs such as *Melampodium leucanthum* (plains blackfoot) and *Zinnia grandiflora* (Rocky Mountain zinnia) are commonly encountered. Woody species such as *Yucca glauca* (soapweed yucca), *Artemisia filifolia* (sand sagebrush), and *Opuntia imbricata* (tree cholla) may be present.

VEGETATION TYPE:

High Plains: Shortgrass Prairie (2907)
Western Great Plains Shortgrass Prairie
Identifier: CES303.672 **MoRAP Code:** 2907
Description: As described for system.

Western Great Plains Sand Prairie
Identifier: CES303.670

Geology: Aeolian and alluvial deep sands.
Landform: Level to rolling uplands.
Soils: Deep Sand and Sandhill ecoclasses.

Description: Grasslands associated with deep sands of aeolian and/or alluvial origin in western Oklahoma. This grassland may be interdigitated with shrublands of **Western Great Plains Sandhill Steppe (CES303.671)**. Occurrences may be dominated by species such as *Schizachyrium scoparium* (little bluestem), *Andropogon gerardii* (big bluestem), and *Panicum*

virgatum (switchgrass), but may also contain species such as *Andropogon hallii* (sand bluestem), *Sporobolus cryptandrus* (sand dropseed), *Eragrostis trichodes* (sand lovegrass), *Cenchrus* spp. (sandburs), and *Calamovilfa gigantea* (giant sandreed). Some shrubs may be present including *Artemisia filifolia* (sand sagebrush), *Prunus angustifolia* (Chickasaw plum), and *Quercus havardii* (Havard shin oak).

VEGETATION TYPE:

High Plains: Sand Prairie (8007)
Western Great Plains Sand Prairie
Identifier: CES303.670 **MoRAP Code:** 8007
Description: As described for system.

Texas Blackland Tallgrass Prairie
Identifier: CES205.684

Geology: Associated with clayey residuum over calcareous substrate.
Landform: Level to gently rolling and dissected uplands. Significant microtopographic relief may be present in unplowed occurrences.
Soils: Primarily vertisols of the Clay Prairie ecoclass.

Description: These grasslands have generally been converted to improved pasture in Oklahoma and little is known of the current composition. They are often continuous with, and may be indistinguishable compositionally from, pasture and managed grasslands of other types within the West Gulf Coastal Plain.

VEGETATION TYPE:

Blackland: Pasture/Prairie (207)
Texas Blackland Tallgrass Prairie
Identifier: CES205.684 **MoRAP Code:** 207
Description: As described for system.

West Gulf Coastal Plain Northern Calcareous Prairie
Identifier: CES203.377

Geology: Associated with clayey residuum over calcareous substrate of Cretaceous age.
Landform: Rolling hills, valley slopes, and level uplands.
Soils: Often occupying soils of the Clay Prairie ecoclass.

Description: These grasslands occur within a matrix of forest and woodlands of the West Gulf Coastal Plain, and typically occur in deep soils, though they may also occur on relatively shallow

soils over limestones or silty shales. Few intact remnants of this type remain, with most being converted to improved pasture. Some native species such as *Sorghastrum nutans* (yellow Indiangrass), *Bouteloua curtipendula* (sideoats grama), and *Panicum virgatum* (switchgrass) may remain.

VEGETATION TYPE:

West Gulf Coastal Plain: Northern Calcareous Prairie/Pasture (14307)

West Gulf Coastal Plain Northern Calcareous Prairie
Identifier: CES203.377 **MoRAP Code:** 14307
Description: As described for system.

Western Great Plains Foothill and Piedmont Grassland (Not Mapped)

Identifier: CES303.817

Geology: Primarily associated with escarpments and breaks of the Mesozoic formations of the Black Mesa region, including the Morrison and Purgatoire Formations and Dakota Sandstone. It may also occur in dissected portions of the Tertiary Raton Basalt.
Landform: High plateaus and gentle slopes.
Soils: May be found on Shallow Sandstone and Breaks soils at the highest elevations of the Black Mesa.

Description: These grasslands occupy high plateaus and gentle slopes associated with escarpments and breaks of the Mesozoic formations of the Black Mesa region, including the Morrison and Purgatoire Formations and Dakota Sandstone. Occurrences represent mixedgrass prairie at high elevations that may be represented in extreme western Oklahoma, but are not here mapped. Typical occurrences further west occur at elevations higher (> 1600 m) than those present in Oklahoma (~1500 m).

Western Great Plains Tallgrass Prairie

Identifier: CES303.673

Geology: Quaternary alluvium and silty or loamy residuum.
Landform: Low landscape positions where moisture accumulation occurs.
Soils: Meadow and Seep Meadow ecoclasses.

Description: This grassland type is mapped on areas with low topographic position and mesic edaphic characteristics. Surrounding (less mesic) grasslands generally belong to the **Central Mixedgrass Prairie (CES303.659)**. *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (yellow Indiangrass), and other tallgrass species may be commonly encountered.

VEGETATION TYPES:

High Plains: Tallgrass Prairie (8107)

Western Great Plains Tallgrass Prairie
Identifier: CES303.673 **MoRAP Code:** 8107
Description: As described for system.

Herbaceous Wetlands

Western Great Plains Closed Depression Wetland
Identifier: CES303.666

Geology: Primarily associated with the Ogallala Formation.
Landform: Closed, internally draining basins.
Soils: Basins, often with clayey subsoil.

Description: Description: As mapped, this system represents the playas of the southern Great Plains. They are shallow, small (averaging about 6 ha), generally circular, recharge basins receiving moisture from rainfall within internally draining watersheds and lacking significant overland drainage from the basins. They are often characterized as occupying soils with a clay layer of reduced permeability, and are variably wet and dry depending on local weather conditions. Moisture accumulation occurs through overland flow of rainfall falling on the surrounding, internally draining watershed, and drying results from evaporation, transpiration, and infiltration, with playas representing a significant recharge feature of the Ogallala Aquifer. This system is typically dominated by herbaceous vegetation including species such as *Pascopyrum smithii* (western wheatgrass), *Bouteloua dactyloides* (buffalograss), *Eleocharis macrostachya* (pale spikerush), *Panicum obtusum* (vine mesquite), *Helianthus ciliaris* (blue-weed), *Phyla cuneifolia* (wedgeleaf), *Oenothera canescens* (beakpod eveningprimrose), *Chenopodium leptophyllum* (narrowleaved goosefoot), *Ambrosia grayi* (woollyleaf burr ragweed), *Polygonum pensylvanicum* (Pennsylvania smartweed), and *Symphyotrichum subulatum* (hierba del marrano). Species such as *Bouteloua dactyloides* (buffalograss) and *Pascopyrum smithii* (western wheatgrass) may occupy drier portions of a playa, or may occupy entire playas when those playas have lacked inundation for extended periods. Wetter portions of the playa may be occupied by marshes if the inundation has been maintained over extended periods. Species richness can vary considerably among individual examples of this system and is especially influenced by hydroperiod and adjacent land use, which is often agriculture. Dynamic processes that affect these depressions are hydrological changes, grazing, and conversion to agricultural use. This system differs from **Western Great Plains Open Freshwater Depression Wetland (CES303.675)** in that the hydrology of these open wetlands are influenced by associated drainages.

VEGETATION TYPES:

High Plains: Playa Grassland (6907)

Western Great Plains Closed Depression Grassland
Identifier: CES303.666.7 **MoRAP Code:** 6907
Description: Grasslands that occupy the drier portions of playa basins, often dominated by species such as *Pascopyrum smithii* (western wheatgrass) and *Bouteloua dactyloides* (buffalograss). Other species commonly encountered include *Panicum obtusum* (vine mesquite), *Iva axillaris* (povertyweed), *Schedonnardus paniculatus* (tumblegrass),

Hordeum jubatum (foxtail barley), *Symphyotrichum divaricatum* (southern annual saltmarsh aster), *Polypogon monspeliensis* (annual rabbitsfoot grass), *Ambrosia grayi* (woollyleaf burr ragweed), and *Chenopodium leptophyllum* (narrowleaved goosefoot).

High Plains: Playa Marsh (6908)

Western Great Plains Closed Depression Wetland
Identifier: CES303.666.8 **MoRAP Code:** 6908
Description: Wetland vegetation forming a moist-soil margin on playa lakes and other depressions. Species such as *Eleocharis macrostachya* (pale spikerush), *Marsilea vestita* (hairy waterclover), *Cyperus* spp. (flatsedges), *Polygonum* spp. (smartweeds), *Phyla cuneifolia* (wedgeleaf), and *Typha* spp. (cattails) are commonly encountered.

Western Great Plains Saline Depression Wetland
Identifier: CES303.669

Geology: Usually Quaternary alluvium, sometimes outwash from nearby Permian gypsum deposits.
Landform: Broad, low flats.
Soils: Salt flats and salty bottomlands.

Description: This system is associated with strongly saline soils and occupies broad basins. Areas of these broad basins may be sparsely vegetated and salt-encrusted. Salt-tolerant and halophytic species such as *Distichlis spicata* (saltgrass), *Hordeum jubatum* (foxtail barley), and *Sporobolus airoides* (alkali sacaton) characterize the occurrences. Other herbaceous species that may be present include *Polypogon monspeliensis* (annual rabbitsfoot grass), *Ambrosia psilostachya* (western ragweed), *Symphyotrichum divaricatum* (southern annual saltmarsh aster), *Bassia scoparia* (burningbush), and *Heliotropium curassavicum* (salt heliotrope). Wetter sites may be dominated by species such as *Schoenoplectus americanus* (American bulrush) and *Eleocharis macrostachya* (pale spikerush). Woody species such as *Baccharis salicina* (willow baccharis) and the non-native *Tamarix* spp. (saltcedars) may be present.

VEGETATION TYPES:

High Plains: Saline Flat (3910)

Western Great Plains Saline Depression Sparse Vegetation
Identifier: CES303.669.10 **MoRAP Code:** 3910
Description: Sparsely vegetated flats, often with salt encrusted surface.

High Plains: Salty Grassland (3907)

Western Great Plains Saline Depression Grassland
Identifier: CES303.669.7 **MoRAP Code:** 3907
Description: Grasslands of moist saline soils such as around lakes, salt flats, and salty drainages that are often dominated by species such as *Distichlis spicata* (saltgrass). Other

grasses that maybe be commonly encountered include *Hordeum jubatum* (foxtail barley), *Sporobolus airoides* (alkali sacaton), and *Polypogon monspeliensis* (annual rabbitsfoot grass). Forbs such as *Ambrosia psilostachya* (western ragweed), *Symphyotrichum divaricatum* (southern annual saltmarsh aster), *Bassia scoparia* (burningbush), and *Heliotropium curassavicum* (salt heliotrope) may also be present. Woody species such as *Baccharis salicina* (willow baccharis) and *Tamarix* spp. (saltcedars) may be present.

High Plains: Salt Marsh (3908)

Western Great Plains Saline Depression Wetland
Identifier: CES303.669.8 **MoRAP Code:** 3908
Description: Emergent wetlands of saline soils such as around salt lakes, salt flats, and salty drainages. Species such as *Schoenoplectus americanus* (American bulrush), *Eleocharis macrostachya* (pale spikerush), and *Distichlis spicata* (saltgrass) are commonly encountered.

High Plains: Salt Lake Shrubland (3906)

Western Great Plains Saline Depression Shrubland
Identifier: CES303.669.6 **MoRAP Code:** 3906
Description: Shrublands associated with salt flats or saline drainages. *Tamarix* spp. (saltcedars) are commonly present. Other species such as *Baccharis salicina* (willow baccharis) may also be abundant.

Western Great Plains Open Freshwater Depression Wetland
Identifier: CES303.675

Geology: Depressions over various strata.
Landform: Depressions in relatively level landforms, sometimes associated with drainages. Occurrences may be associated with anthropogenic basins.
Soils: This system occupies a variety of soil types.

Description: This system represents emergent marsh in the western portions of Oklahoma. Vegetation may be dominated by species such as *Schoenoplectus americanus* (American bulrush), *Juncus torreyi* (Torrey's rush), *Eleocharis macrostachya* (pale spikerush), *Cyperus* spp. (flatsedges), *Typha* spp. (cattails), and *Polygonum* spp. (smartweeds).

VEGETATION TYPE:

High Plains: Depression Herbaceous Wetland (3808)

Western Great Plains Open Freshwater Depression Wetland
Identifier: CES303.675 **MoRAP Code:** 3808
Description: As described for system.

Eastern Great Plains Wet Meadow, Prairie and Marsh
Identifier: CES205.687

Geology: Depressions over various strata, often lined with clayey residuum.
Landform: Depressions in relatively level landforms, sometimes associated with minor drainages. This system may often occupy anthropogenic basins.
Soils: This system occupies a variety of soil types.

Description: This system represents emergent marshes over much of eastern Oklahoma. It may be found along creeks and streams, upland depressions, lake borders, and man-made impoundments. Vegetation may be dominated by species such as *Typha* spp. (cattails), *Schoenoplectus americanus* (American bulrush), *Juncus effusus* (common rush), *Schoenoplectus tabernaemontani* (softstem bulrush), *Eleocharis* spp. (spikerushes), *Ludwigia palustris* (marsh seedbox), and *Polygonum hydropiperoides* (swamp smartweed). Woody species, including *Cephalanthus occidentalis* (common buttonbush), may be present.

VEGETATION TYPE:

Eastern Great Plains: Herbaceous Wetland (14717)
Eastern Great Plains Wet Meadow, Prairie, and Marsh
Identifier: CES205.687 **MoRAP Code:** 14717
Description: As described for system.

West Gulf Coastal Plain Herbaceous Seep and Bog (Not Mapped)
Identifier: CES203.194

Description: This wet, small patch system occurs as localized seeps in southeastern Oklahoma where it is associated with the Cretaceous Antlers Sand. This herbaceous wetland is maintained by seepage at the zone between an overlaying, permeable sandy layer and a lower relatively impermeable layer. The vegetation of intact examples is dominated by a dense, species-rich graminoid-forb layer less than 1 m tall with continuous or nearly continuous cover.

Woody Wetlands and Riparian

South-Central Interior Large Floodplain
Identifier: CES202.705

Geology: Quaternary alluvium.
Landform: Broad, alluvial floodplains:
Soils: Loamy and other Bottomland ecoclasses.

Description: This system occurs along large rivers where topography and alluvial processes have resulted in well-developed floodplains in much of northeastern Oklahoma. Bottomland soils developed through alluvial deposition characterize the system. This system includes a number of physiognomic conditions including sparsely vegetated mud and sand flats, shrublands, and herbaceous wetlands. Most commonly the system has a hardwood forest or woodland structure with species such as *Carya illinoinensis* (pecan), *Fraxinus pennsylvanica* (green ash), *Platanus occidentalis* (American sycamore), *Ulmus rubra* (slippery elm), *Celtis laevigata* (sugar hackberry), *Quercus macrocarpa* (bur oak), *Acer negundo* (boxelder), and *Salix nigra* (black willow). *Juniperus virginiana* (eastern redcedar) may dominate the canopy in some areas. Species in the shrub layer, or constituting shrublands with sparse overstory canopy, include species common to the canopy of forests and woodlands as well as *Cornus drummondii* (roughleaf dogwood), *Cephalanthus occidentalis* (common buttonbush), and *Amorpha fruticosa* (false indigo bush). Herbaceous wetlands may contain species such as *Schoenoplectus* spp. (bulrushes), *Eleocharis* spp. (spikerushes), *Typha* spp. (cattails), *Polygonum* spp. (smartweeds), *Ludwigia palustris* (marsh seedbox), and *Nelumbo lutea* (American lotus).

VEGETATION TYPES:

South Central Interior: Bottomland Barrens (14800)

South-Central Interior Large Floodplain Sparse Vegetation
Identifier: CES202.705.0 **MoRAP Code:** 14800
Description: Sparsely vegetated mud, sand, and gravel flats along rivers.

South Central Interior: Bottomland Mixed Evergreen – Hardwood Forest (14803)

South-Central Interior Large Floodplain Mixed Deciduous – Evergreen Forest
Identifier: CES202.705.3 **MoRAP Code:** 14803
Description: Forest and woodlands with deciduous species as mentioned in the system description and *Juniperus virginiana* (eastern redcedar) sharing the canopy.

South Central Interior: Bottomland Hardwood Forest (14804)

South-Central Interior Large Floodplain Hardwood Forest
Identifier: CES202.705.4 **MoRAP Code:** 14804

Description: Forest and woodlands of deciduous hardwoods dominated by species such as *Carya illinoinensis* (pecan), *Fraxinus pennsylvanica* (green ash), *Platanus occidentalis* (American sycamore), *Ulmus rubra* (slippery elm), *Celtis laevigata* (sugar hackberry), *Quercus macrocarpa* (bur oak), *Acer negundo* (boxelder), and *Salix nigra* (black willow).

South Central Interior: Bottomland Shrubland and Young Woodland (14806)

South-Central Interior Large Floodplain Shrubland and Young Woodland
Identifier: CES202.705.6 **MoRAP Code:** 14806
Description: Shrublands and young woodlands dominated by young individuals of the canopy of the surrounding forest and woodland, or by species such as *Cephalanthus occidentalis* (common buttonbush), *Amorpha fruticosa* (false indigo bush), or *Cornus drummondii* (roughleaf dogwood).

South Central Interior: Bottomland Eastern Redcedar Woodland and Shrubland (14815)

South-Central Interior Large Floodplain Eastern Redcedar Woodland and Shrubland
Identifier: CES202.705.15 **MoRAP Code:** 14815
Description: Bottomland woodland or shrubland dominated by *Juniperus virginiana* (eastern redcedar).

South Central Interior: Bottomland Herbaceous Wetland (14817)

South-Central Interior Large Floodplain Herbaceous Wetland
Identifier: CES202.705.17 **MoRAP Code:** 14817
Description: Herbaceous wetlands along large rivers with species such as *Schoenoplectus* spp. (bulrushes), *Eleocharis* spp. (spikerushes), *Typha* spp. (cattails), *Polygonum* spp. (smartweeds), *Ludwigia palustris* (marsh seedbox), and *Nelumbo lutea* (American lotus).

South-Central Interior Small Stream and Riparian
Identifier: CES202.706

Geology: Various geologic strata of north-central Oklahoma.
Landform: Small streams and drainages in the uplands, typically characterized by erosional processes.
Soils: This system occupies various soils.

Description: Flooding and scouring are processes that characterize this system. Little to moderate alluvial floodplain development occurs. This system grades into **Ozark-Ouachita Riparian (CES202.703)** to the east and **Western Great Plains Riparian (CES303.956)** to the west. Various physiognomic conditions are represented in the system, including sparsely vegetated mud, sand, and gravel bars to closed canopy forest and woodland. Herbaceous wetlands may also be associated with the system. Common canopy species may include *Celtis laevigata* (sugar hackberry), *Platanus occidentalis* (American sycamore), *Ulmus americana* (American elm), *Salix nigra* (black willow), and *Carya illinoinensis* (pecan). Shrubs in the

understory, and sometimes forming shrublands, include *Ilex decidua* (possumhaw), *Cornus drummondii* (roughleaf dogwood), and *Cephalanthus occidentalis* (common buttonbush).

VEGETATION TYPES:

South Central Interior: Riparian Barrens (15100)

South-Central Interior Small Stream and Riparian Sparse Vegetation
Identifier: CES202.706.0 **MoRAP Code:** 15100
Description: Sparsely vegetated areas of riparian corridors including mud and sand flats or gravel and cobble beds.

South Central Interior: Riparian Mixed Evergreen – Hardwood Woodland (15103)

South-Central Interior Small Stream and Riparian Deciduous – Evergreen Mixed Woodland
Identifier: CES202.706.3 **MoRAP Code:** 15103
Description: Woodlands along riparian corridors that have a canopy of mixed hardwood species of the system and *Juniperus virginiana* (eastern redcedar).

South Central Interior: Riparian Hardwood Woodland (15104)

South-Central Interior Small Stream and Riparian Hardwood Woodland
Identifier: CES202.706.4 **MoRAP Code:** 15104
Description: Hardwood woodlands along small streams and riparian corridors dominated by species described for the system.

South Central Interior: Riparian Shrubland and Young Woodland (15106)

South-Central Interior Small Stream and Riparian Shrubland and Young Woodland
Identifier: CES202.706.6 **MoRAP Code:** 15106
Description: Young woodlands composed of species common to the system or shrublands as described for the system.

South Central Interior: Riparian Eastern Redcedar Woodland and Shrubland (15115)

South-Central Interior Small Stream and Riparian Eastern Redcedar Woodland and Shrubland
Identifier: CES202.706.15 **MoRAP Code:** 15115
Description: Small streams and riparian corridors dominated by woodlands or shrublands of *Juniperus virginiana* (eastern redcedar).

South Central Interior: Riparian Herbaceous Wetland (15117)

South-Central Interior Small Stream and Riparian Herbaceous Wetland
Identifier: CES202.706.17 **MoRAP Code:** 15117
Description: Herbaceous wetlands of small streams and riparian corridors often containing species such as *Typha* spp. (cattails), *Juncus* spp. (rushes), *Schoenoplectus* spp. (bulrushes), and *Eleocharis* spp. (spikerushes).

Ozark-Ouachita Riparian

Identifier: CES202.703

Geology: Various geologic strata, but often limestones, sandstones, or shales of Mississippian or Pennsylvanian age.

Landform: Small streams and drainages in the uplands, typically characterized by erosional processes.

Soils: This system occupies various soils.

Description: This system represents small streams and drainages characterized by erosional processes with little or no alluvial floodplain development, and may have steep banks. The system may be represented as sparsely vegetated gravel and cobble drainages to hardwood canopies bordering small streams. Hardwood canopy species may include *Platanus occidentalis* (American sycamore), *Juglans nigra* (black walnut), *Celtis laevigata* (sugar hackberry), *Fraxinus pennsylvanica* (green ash), and *Ulmus americana* (American elm). Species from the surrounding upland canopy may also be present including *Quercus stellata* (post oak), *Quercus muehlenbergii* (chinkapin oak), and *Carya cordiformis* (bitternut hickory). Some streams may have a canopy that includes *Juniperus virginiana* (eastern redcedar) or *Pinus echinata* (shortleaf pine). Species such as *Alnus serrulata* (hazel alder) and *Hamamelis virginiana* (American witchhazel) may line these streams.

VEGETATION TYPES:

Ozark-Ouachita: Riparian Barrens (13500)

Ozark-Ouachita Riparian Sparse Vegetation
Identifier: CES202.703.0 **MoRAP Code:** 13500
Description: Sparsely vegetated stretches of small streams and drainages including gravel, sand, and cobble bars. Rocky sites through which streams flow may also be present. Scattered patches of annual grasses and annual/biennial forbs may occur along with scattered and uncommon shrubs including *Alnus serrulata* (hazel alder) and *Hamamelis virginiana* (American witchhazel).

Ozark-Ouachita: Riparian Mixed Evergreen – Hardwood Woodland (13503)

Ozark-Ouachita Riparian Deciduous – Evergreen Mixed Woodland
Identifier: CES202.703.3 **MoRAP Code:** 13503
Description: Woodlands with a mixed canopy containing hardwood species common to the system in conjunction with *Juniperus virginiana* (eastern redcedar) and/or *Pinus echinata* (shortleaf pine).

Ozark-Ouachita: Riparian Hardwood Woodland (13504)

Ozark-Ouachita Riparian Hardwood Woodland
Identifier: CES202.703.4 **MoRAP Code:** 13504
Description: Small stream and riparian corridor with a canopy dominated by hardwood species as described for the system.

Ozark-Ouachita: Riparian Shrubland and Young Woodland (13506)

Ozark-Ouachita Riparian Shrubland and Young Woodland
Identifier: CES202.703.6 **MoRAP Code:** 13506
Description: Small stream and riparian corridor with young individuals of the hardwood species common to the system or shrubs or small trees such as *Ostrya virginiana* (hophornbeam), *Acer rubrum* (red maple), *Hamamelis virginiana* (American witchhazel), *Alnus serrulata* (hazel alder), and *Ulmus alata* (winged elm).

Ozark-Ouachita: Riparian Evergreen Woodland and Shrubland (13515)

Ozark-Ouachita Riparian Evergreen Woodland and Shrubland
Identifier: CES202.703.15 **MoRAP Code:** 13515
Description: Shrublands and woodlands along small streams and riparian corridors dominated by *Juniperus virginiana* (eastern redcedar) and/or *Pinus echinata* (shortleaf pine).

Ozark-Ouachita: Riparian Herbaceous Wetland (13517)

Ozark-Ouachita Riparian Herbaceous Wetland
Identifier: CES202.703.17 **MoRAP Code:** 13517
Description: Herbaceous wetlands along small streams and riparian corridors of the region.

Western Great Plains Floodplain
Identifier: CES303.678

Geology: Quaternary alluvium along large rivers.
Landform: Floodplains.
Soils: Loamy Bottomland, Sandy Bottomland, and Sub-Irrigated Bottomland ecoclasses.

Description: This system is found in the floodplains of medium and large rivers of western Oklahoma. Alluvial deposition and periodic flooding characterize the system. Dominant communities range from sparsely vegetated sand, mud, or gravel flats to open or dense forests and woodlands to herbaceous wetlands. Tree dominants include *Populus deltoides* (eastern cottonwood), *Quercus macrocarpa* (bur oak), *Celtis laevigata* (sugar hackberry), *Sapindus saponaria* var. *drummondii* (western soapberry), *Ulmus americana* (American elm), *Salix nigra* (black willow), and to the east *Carya illinoinensis* (pecan). The non-native species such as *Ulmus pumila* (Siberian elm), *Elaeagnus angustifolia* (Russian olive), and *Tamarix* spp. (saltcedars) may be conspicuous in some occurrences. *Juniperus virginiana* (eastern redcedar) may be present to dominant as well. Shrublands may be made up of young individuals of the overstory or species such as *Cephalanthus occidentalis* (common buttonbush), *Amorpha fruticosa* (false indigo bush), and *Salix exigua* (sandbar willow). Some shrub dominated occurrences may contain *Prosopis glandulosa* (honey mesquite). Herbaceous wetlands may contain species such as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Eleocharis* spp. (spikerushes), *Polygonum* spp. (smartweeds). In limited situations, tallgrass species such as *Andropogon gerardii* (big bluestem) and *Panicum virgatum* (switchgrass) may form significant herbaceous cover in the understory of the wooded canopy.

VEGETATION TYPES:

High Plains: Bottomland Barrens (2500)

Western Great Plains Sparsely Vegetated Floodplain
Identifier: CES303.678.0 **MoRAP Code:** 2500
Description: Sparsely vegetated mud, sand, or gravel flats of large floodplains.

High Plains: Bottomland Hardwood – Eastern Redcedar Forest (2503)

Western Great Plains Floodplain Deciduous – Evergreen Mixed Forest
Identifier: CES303.678.3 **MoRAP Code:** 2503
Description: Bottomlands dominated by hardwood species as described for the system and *Juniperus virginiana* (eastern redcedar).

High Plains: Bottomland Hardwood Forest (2504)

Western Great Plains Floodplain Hardwood Forest
Identifier: CES303.678.4 **MoRAP Code:** 2504
Description: Bottomland forests dominated by species such as *Populus deltoides* (eastern cottonwood), *Quercus macrocarpa* (bur oak), *Celtis laevigata* (sugar hackberry), *Sapindus saponaria* var. *drummondii* (western soapberry), *Ulmus americana* (American elm), *Salix nigra* (black willow), and to the east *Carya illinoinensis* (pecan). The non-native species such as *Ulmus pumila* (Siberian elm), *Elaeagnus angustifolia* (Russian olive), and *Tamarix* spp. (saltcedars) may be conspicuous in some occurrences.

High Plains: Bottomland Deciduous Shrubland (2506)

Western Great Plains Floodplain Deciduous Shrubland
Identifier: CES303.678.6 **MoRAP Code:** 2506
Description: Bottomlands with significant canopy in the shrub stratum. Dominants may include saplings of the species common to the surrounding bottomland forest and woodland, or species such as *Cephalanthus occidentalis* (common buttonbush), *Amorpha fruticosa* (false indigo bush), or *Prosopis glandulosa* (honey mesquite).

High Plains: Bottomland Eastern Redcedar Woodland and Shrubland (2515)

Western Great Plains Floodplain Eastern Redcedar Woodland and Shrubland
Identifier: CES303.678.15 **MoRAP Code:** 2515
Description: Bottomlands dominated by woodlands or shrublands of *Juniperus virginiana* (eastern redcedar).

High Plains: Bottomland Herbaceous Wetland (2517)

Western Great Plains Floodplain Herbaceous Wetland
Identifier: CES303.678.17 **MoRAP Code:** 2517
Description: Herbaceous wetlands dominated by species such as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Eleocharis* spp. (spikerushes), *Polygonum* spp. (smartweeds) and occupying the floodplains of larger rivers and stream.

Western Great Plains Riparian

Identifier: CES303.956

Geology: Various substrates along drainages. Local alluvial deposits are common.
Landform: Small streams and drainages in the uplands, typically characterized by erosional processes. Some alluvial development may be present.
Soils: This system occupies various soils.

Description: This system is found along medium and small rivers, often with some alluvial deposition but also occupying deep cut ravines and small streambeds with little alluvial development. The vegetation composition resembles that of drier portions of occurrences of the **Western Great Plains Floodplain (CES303.678)**, but overall vegetation abundance is generally lower. In occurrences with significant overstory canopy, dominants may include *Populus deltoides* (eastern cottonwood), *Sapindus saponaria* var. *drummondii* (western soapberry), *Celtis laevigata* (sugar hackberry), and *Salix nigra* (black willow). Non-native species such as *Ulmus pumila* (Siberian elm) and *Tamarix* spp. (saltcedar) may be present to dominant. Shrub dominated occurrences may contain saplings of species of the overstory of the surrounding forest and woodland, or species such as *Sideroxylon lanuginosum* (gum bumelia), *Cornus drummondii* (roughleaf dogwood), *Prunus angustifolia* (Chickasaw plum), *Amorpha fruticosa* (false indigo bush), *Prosopis glandulosa* (honey mesquite), and *Salix exigua* (sandbar willow). Some of these shrubs may also be present in the understory of the woodlands and forests, though shrubby understory is usually patchy or absent. Herbaceous species often encountered in the understory include *Elymus canadensis* (Canada wildrye), *Schizachyrium scoparium* (little bluestem), *Sporobolus cryptandrus* (sand dropseed), *Ambrosia psilostachya* (western ragweed), and *Ambrosia trifida* (giant ragweed). Non-native herbaceous species that may be present to dominant include *Sorghum halepense* (Johnsongrass), *Bromus tectorum* (cheatgrass), *Bromus arvensis* (Japanese brome), and *Lolium perenne* (perennial ryegrass). Herbaceous wetlands along these drainages may be present and contain species such as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Eleocharis* spp. (spikerushes), and *Polygonum* spp. (smartweeds). Some occurrences may be dominated by *Juniperus virginiana* (eastern redcedar), or less commonly, *Juniperus pinchotii* (redberry juniper).

VEGETATION TYPES:

High Plains: Riparian Barrens (2700)

Western Great Plains Riparian Sparse Vegetation
Identifier: CES303.596.0 **MoRAP Code**: 2700
Description: This type is represented by sand, mud, and gravel flats along drainages. Rocky sites through which streams flow may also be present.

High Plains: Riparian Mixed Hardwood – Eastern Redcedar Woodland (2703)

Western Great Plains Riparian Hardwood – Eastern Redcedar Mixed Woodland
Identifier: CES303.596.3 **MoRAP Code:** 2703
Description: Woodlands along drainages, creeks, and small streams where the overstory is dominated by a mix of hardwoods such as *Populus deltoides* (eastern cottonwood), *Salix nigra* (black willow), and *Sapindus saponaria* var. *drummondii* (western soapberry)

and *Juniperus virginiana* (eastern redcedar). Less commonly the canopy may include *Juniperus pinchotii* (redberry juniper).

High Plains: Riparian Hardwood Woodland (2704)

Western Great Plains Riparian Hardwood Woodland
Identifier: CES303.596.4 **MoRAP Code:** 2704
Description: These woodlands are dominated by hardwood species such as *Populus deltoides* (eastern cottonwood), *Sapindus saponaria* var. *drummondii* (western soapberry), *Celtis laevigata* (sugar hackberry), *Salix nigra* (black willow), and *Quercus macrocarpa* (bur oak). *Juniperus virginiana* (eastern redcedar) may be present, but is not dominant. The non-native species *Ulmus pumila* (Siberian elm) may be an important canopy species.

High Plains: Riparian Deciduous Shrubland (2706)

Western Great Plains Riparian Deciduous Shrubland
Identifier: CES303.596.6 **MoRAP Code:** 2706
Description: Shrublands along drainages, creeks, and small streams where an overstory canopy is sparse or lacking and the shrub layer is well-represented. Dominant species of this type may be saplings of overstory species of the surrounding woodland or species such as *Sideroxylon lanuginosum* (gum bumelia), *Cornus drummondii* (roughleaf dogwood), *Prosopis glandulosa* (honey mesquite), and *Amorpha fruticosa* (false indigo bush). The non-native *Tamarix* spp. (saltcedars) may also be present to dominant.

High Plains: Riparian Eastern Redcedar Woodland and Shrubland (2715)

Western Great Plains Riparian Juniper Woodland and Shrubland
Identifier: CES303.596.15 **MoRAP Code:** 2715
Description: Woodlands or shrublands along drainages, creeks, and small drainages dominated by *Juniperus virginiana* (eastern redcedar). Less commonly, *Juniperus pinchotii* (redberry juniper) may be present to dominant with, or instead of *Juniperus virginiana* (eastern redcedar).

High Plains: Riparian Herbaceous Wetland (2717)

Western Great Plains Riparian Herbaceous Wetland
Identifier: CES303.596.17 **MoRAP Code:** 2717
Description: Herbaceous wetlands associated with drainages, creeks, and small drainages. These wetlands may be dominated by species such as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Eleocharis* spp. (spikerushes), and *Polygonum* spp. (smartweeds).

Western Great Plains Mesquite Woodland and Shrubland

Identifier: CES303.668

Geology: Typically occupies Quaternary alluvium.
Landform: Broad drainages.

Soils: This system typically occupies deep alluvial soils of loams, silt loams, clays, and clay loams.

Description: This system occurs in the western portions of Oklahoma and is dominated by *Prosopis glandulosa* (honey mesquite). It usually occurs on deeper alluvial soils along drainages. Other species that may be present include *Sapindus saponaria* var. *drummondii* (western soapberry), *Ziziphus obtusifolia* (lotebush), and *Sideroxylon lanuginosum* (gum bumelia). Herbaceous species that may be present may include *Bouteloua dactyloides* (buffalograss), *Bouteloua gracilis* (blue grama), *Aristida purpurea* (purple threeawn), and *Sporobolus cryptandrus* (sand dropseed). *Prosopis glandulosa* (honey mesquite) may also be dominant or conspicuous in other systems such as **Wichita Mountain Woodland (CES???.???), Southern Rocky Mountain Pinyon – Juniper Woodland (CES306.835),** and **Llano Estacado Caprock Escarpment and Breaks Shrubland and Steppe (CES303.725)**. Additionally, *Prosopis glandulosa* (honey mesquite) may invade prairie sites and such sites dominated by *Prosopis glandulosa* (honey mesquite) would be treated as **Ruderal Mesquite Shrubland**.

VEGETATION TYPE:

High Plains: Mesquite Shrubland (5406)

Western Great Plains Mesquite Shrubland
Identifier: CES303.668.6 **MoRAP Code:** 5406
Description: As described for system.

West Gulf Coastal Plain Large River Floodplain Forest
Identifier: CES203.488

Geology: Primarily Quaternary alluvium.
Landform: Broad valley bottoms of larger rivers where significant alluvial deposition has occurred.
Soils: Primarily Loamy and Sandy Bottomland ecoclasses.

Description: Bottomland hardwoods typically dominate occurrences of this system. These forests and woodlands occur on large rivers of the West Gulf Coastal Plain and include species with a range of tolerances to hydric conditions. Some sloughs, swamps, and other deepwater habitats may be dominated by *Taxodium distichum* (baldcypress), with shrubs such as *Alnus serrulata* (hazel alder), *Cephalanthus occidentalis* (common buttonbush), *Planera aquatica* (planertree), *Forestiera acuminata* (swamp privet), and *Cornus foemina* (stiff dogwood), floating aquatics such as *Lemna* spp. (duckweeds), and herbaceous species above the level of continuous flooding such as *Hydrocotyle umbellata* (manyflower marshpennywort) and *Ranunculus longirostris* (longbeak buttercup). In less deepwater habitats, but still fairly hydric situations, occurrences may have an overstory of *Quercus lyrata* (overcup oak), *Carya aquatica* (water hickory), *Quercus phellos* (willow oak), *Acer rubrum* (red maple), and *Quercus texana* (Nuttall's oak), with an understory containing species such as *Planera aquatica* (planertree) and *Crataegus marshallii* (parsley hawthorn). Other occurrences may be dominated by overstory species such as

Quercus nigra (water oak), *Carya illinoinensis* (pecan), *Celtis laevigata* (sugar hackberry), *Liquidambar styraciflua* (sweetgum), *Carya cordiformis* (bitternut hickory), *Fraxinus pennsylvanica* (green ash), *Carya myristiciformis* (nutmeg hickory), and *Ulmus rubra* (slippery elm), with an understory containing species such as *Lindera benzoin* (spicebush), *Crataegus marshallii* (parsley hawthorn), *Crataegus viridis* (green hawthorn), *Carpinus caroliniana* (American hornbeam), *Asimina triloba* (pawpaw), *Arundinaria gigantea* (giant cane), and *Ilex decidua* (possumhaw). *Pinus taeda* (loblolly pine) may sometimes be co-dominant in the canopy. Woody vines such as *Berchemia scandens* (Alabama supplejack), *Toxicodendron radicans* (poison ivy), *Campsis radicans* (trumpet creeper), *Brunnichia ovata* (ladies' eardrops), and *Smilax bona-nox* (saw greenbrier) may be common. Species such as *Chasmanthium latifolium* (Indian woodoats), *Panicum virgatum* (switchgrass), *Leersia virginica* (whitegrass), *Carex lupulina* (hop sedge), *Carex squarrosa* (squarrosa sedge), *Boehmeria cylindrica* (smallspike false nettle), *Lycopus virginicus* (Virginia water horehound), and *Mikania scandens* (climbing hempvine) may be present in the ground layer. Especially along margins of waterways, species such as *Betula nigra* (river birch), *Platanus occidentalis* (American sycamore), *Acer negundo* (boxelder), *Acer saccharinum* (silver maple), and *Salix nigra* (black willow) may be commonly encountered. Herbaceous wetlands on these sites are often dominated by such species as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Juncus* spp. (rushes), *Carex* spp. (sedges), and *Polygonum* spp. (smartweeds), *Hibiscus laevis* (halderleaf rosemallow), *Sagittaria* spp. (arrowheads), and *Echinodorus berteroi* (upright burhead). Floating aquatics such as *Nuphar lutea* (yellow pond-lily), *Nelumbo lutea* (American lotus), and *Potamogeton* spp. (pondweeds) may also be present.

VEGETATION TYPES:

West Gulf Coastal Plain: Large River Bottomland Barrens (4900)

West Gulf Coastal Plains Large River Floodplain Barrens
Identifier: CES203.488.0 **MoRAP Code:** 4900
Description: Areas of sparse vegetation within the floodplain, including mud flats and sand and gravel bars.

West Gulf Coastal Plain: Large River Bottomland Mixed Hardwood – Evergreen Forest (4903)

West Gulf Coastal Plain Large River Floodplain Mixed Hardwood – Evergreen Forest
Identifier: CES203.488.3 **MoRAP Code:** 4903
Description: Forest along large rivers that are co-dominated by hardwoods and evergreen species such as *Pinus taeda* (loblolly pine) or *Juniperus virginiana* (eastern redcedar).

West Gulf Coastal Plain: Large River Bottomland Hardwood Forest (4904)

West Gulf Coastal Plain Large River Floodplain Hardwood Forest
Identifier: CES203.488.4 **MoRAP Code:** 4904
Description: This type is the most common type expressed for this system with hardwoods such as those described for the system dominating the overstory.

West Gulf Coastal Plain: Large River Bottomland Deciduous Shrubland (4906)

West Gulf Coastal Plain Large River Floodplain Deciduous Shrubland
Identifier: CES203.448.6 **MoRAP Code:** 4906
Description: Occurrences may be successional sites dominated by saplings of species from the overstory of surrounding hardwood forest, or may be dominated by shrub species such as *Cephalanthus occidentalis* (common buttonbush), *Forestiera acuminata* (swamp privet), *Planera aquatica* (planertree), and/or *Ilex decidua* (possumhaw).

West Gulf Coastal Plain: Large River Bottomland Seasonally Flooded Hardwood Forest (4914)

West Gulf Coastal Plain Large River Floodplain Seasonally Flooded Hardwood Forest
Identifier: CES203.448.14 **MoRAP Code:** 4914
Description: This type tends to occur in more hydric situations and may be dominated by species such as *Taxodium distichum* (baldcypress), *Quercus phellos* (willow oak), *Quercus lyrata* (overcup oak), and *Acer rubrum* (red maple).

West Gulf Coastal Plain: Large River Bottomland Evergreen Woodland and Shrubland (4915)

West Gulf Coastal Plain Large River Floodplain Evergreen Woodland and Shrubland
Identifier: CES203.448.15 **MoRAP Code:** 4915
Description: This type is dominated by evergreen species including *Pinus taeda* (loblolly pine) and *Juniperus virginiana* (eastern redcedar) and may occur as woodlands or shrublands when these species are represented as young individuals.

West Gulf Coastal Plain: Large River Bottomland Herbaceous Wetland (4917)

West Gulf Coastal Plain Large River Floodplain Herbaceous Wetland
Identifier: CES203.448.17 **MoRAP Code:** 4917
Description: Herbaceous wetland along large rivers dominated by such species as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Juncus* spp. (rushes), *Carex* spp. (sedges), and *Polygonum* spp. (smartweeds), *Hibiscus laevis* (halderleaf rosemallow), *Sagittaria* spp. (arrowheads), and *Echinodorus berteroi* (upright burhead). Floating aquatics such as *Nuphar lutea* (yellow pond-lily), *Nelumbo lutea* (American lotus), and *Potamogeton* spp. (pondweeds) may also be present.

West Gulf Coastal Plain Small Stream and River Forest

Identifier: CES203.487

Geology: This system may be found over various strata within the West Gulf Coastal Plain, including Quaternary alluvium.

Landform: Drainages, including creeks, streams, and small rivers, typically dominated by erosional rather than depositional situations.

Soils: This system is often associated with erosional sites and therefore may occur on numerous types of soils.

Description: This system occupies small rivers and creeks and examples have fewer of the major geomorphic features characteristic of expansive floodplains. Bottomland hardwood tree species are typically important, but other mesic hardwoods may also be present in areas with less inundation. Forested stands are often dominated by species such as *Liquidambar styraciflua* (sweetgum), *Quercus nigra* (water oak), *Celtis laevigata* (sugar hackberry), *Fraxinus pennsylvanica* (green ash), *Ulmus rubra* (slippery elm), *Quercus falcata* (southern red oak), *Betula nigra* (river birch), and *Platanus occidentalis* (American sycamore). Sites with greater inundation may have species such as *Taxodium distichum* (baldcypress), *Quercus phellos* (willow oak), and *Quercus lyrata* (overcup oak). Sites identified as shrublands may be dominated by sapling of the overstory species of the surrounding forest or by species such as *Cephalanthus occidentalis* (common buttonbush), *Planera aquatica* (planertree), and *Ilex decidua* (possumhaw). Emergent marsh may be present and includes species such as *Typha* spp. (cattails), *Juncus* spp. (rushes), and *Schoenoplectus* spp. (bulrushes).

VEGETATION TYPES:

West Gulf Coastal Plain: Small Stream Barrens (4800)

West Gulf Coastal Plains Small Stream and River Barrens
Identifier: CES203.487.0 **MoRAP Code:** 4800
Description: This type represents sand, mud, and gravel bars along small streams of the West Gulf Coastal Plain.

West Gulf Coastal Plain: Small Stream Mixed Pine – Hardwood Woodland (4803)

West Gulf Coastal Plain Small Stream and River Mixed Evergreen – Hardwood Woodland and Forest
Identifier: CES203.487.3 **MoRAP Code:** 4803
Description: This type occurs along creeks and small rivers and has a canopy co-dominated by hardwoods and evergreen species such as *Pinus taeda* (loblolly pine), or sometimes *Juniperus virginiana* (eastern redcedar).

West Gulf Coastal Plain: Small Stream Hardwood Woodland (4804)

West Gulf Coastal Plain Small Stream and River Hardwood Forest and Woodland
Identifier: CES203.487.4 **MoRAP Code:** 4804
Description: This is the primary type representing this system and is dominated by species such as *Liquidambar styraciflua* (sweetgum), *Quercus nigra* (water oak), *Celtis laevigata* (sugar hackberry), *Fraxinus pennsylvanica* (green ash), *Ulmus rubra* (slippery elm), *Quercus falcata* (southern red oak), *Betula nigra* (river birch), and *Platanus occidentalis* (American sycamore).

West Gulf Coastal Plain: Small Stream Deciduous Shrubland (4806)

West Gulf Coastal Plain Small Stream and River Deciduous Shrubland
Identifier: CES203.487.6 **MoRAP Code:** 4806
Description: This type may represent young stages of the surrounding woodland and forest and may be dominated by saplings of species dominating those types. Or, occurrences may be dominated by shrub species such as *Cephalanthus occidentalis* (common buttonbush), *Planera aquatica* (planertree), and *Ilex decidua* (possumhaw).

West Gulf Coastal Plain: Small Stream Seasonally Flooded Hardwood Woodland (4814)

West Gulf Coastal Plain Small Stream and River Seasonally Flooded Hardwood Forest and Woodland
Identifier: CES203.487.14 **MoRAP Code:** 4814
Description: Occurrences along creeks and small rivers with extended periods of inundation dominated by more hydric species such as *Taxodium distichum* (baldcypress) and *Quercus phellos* (willow oak).

West Gulf Coastal Plain: Small Stream Evergreen Woodland and Shrubland (4815)

West Gulf Coastal Plain Small Stream and River Evergreen Woodland and Shrubland
Identifier: CES203.487.15 **MoRAP Code:** 4815
Description: Sites are dominated by evergreen species including *Pinus taeda* (loblolly pine) and/or *Juniperus virginiana* (eastern redcedar) and may occur as young stands (representing shrubland) or older stands (representing forest and woodland).

West Gulf Coastal Plain: Small Stream Herbaceous Wetland (4817)

West Gulf Coastal Plain Small Stream and River Herbaceous Wetland
Identifier: CES208.487.17 **MoRAP Code:** 4817
Description: This type represents emergent marsh along creeks and small rivers that may be dominated by species such as *Typha* spp. (cattails), *Juncus* spp. (rushes), and *Schoenoplectus* spp. (bulrushes). Other species such as *Polygonum* spp. (smartweeds), *Sagittaria* spp. (arrowheads), and *Echinodorus berteroi* (upright burhead) may also be present.

West Gulf Coastal Plain Seepage Swamp and Baygall (Not Mapped)
Identifier: CES2.3.372

Description: Forested wetlands, often densely wooded, in acidic, seepage-influenced wetland habitats. These wetlands may occur in poorly developed upland drainages, toe-slopes and small headwaters stream bottoms. These environments are prone to long durations of standing water and occur on acidic, poor nutrient soils. Overstory species may include *Nyssa sylvatica* (black gum), *Acer rubrum* (red maple), *Quercus nigra* (water oak), and *Liquidambar styraciflua* (sweetgum). Understory vegetation consistently supports *Smilax laurifolia* (laurel greenbrier), *Osmunda* spp. (osmundas), *Woodwardia areolata* (netted chainfern). The wetlands are embedded in uplands with deep sandy soils. When these communities are associated with streams, they tend to be low gradient with narrow, often braided channels and diffuse drainage patterns. In Oklahoma, this system is restricted to the extreme southeastern portion of the state.

Southeastern Great Plains Floodplain Forest
Identifier: CES205.710

Geology: Large floodplains typically occupying Quaternary alluvium.

Landform: Floodplains of large rivers where significant depositional processes are active.
Soils: Loamy and Sandy Bottomlands are the typical ecoclasses occupied by this system.

Description: This system occurs along large and medium rivers in the southern portions of the Crosstimbers in south-central Oklahoma where broad alluvial floodplains predominate. Alluvial soils and sedimentation processes typify the system. Periodic, intermediate flooding and deposition dominate the formation and maintenance of the system. Vegetation is primarily bottomland hardwood forest and woodland, but the vegetation ranges from sparse vegetation on mud, sand, and gravel bars, to herbaceous wetlands, to shrublands and young woodland. In Oklahoma, the system is intermediate between the West Gulf Coastal Plain floodplains to the east, the South-Central Interior floodplains to the north, and the Western Great Plains floodplains to the west, and shares some floristic components with all three. Overstory of forest and woodland occurrences have canopy dominants that include *Carya illinoinensis* (pecan), *Ulmus rubra* (slippery elm), *Celtis laevigata* (sugar hackberry), *Acer negundo* (boxelder), *Ulmus crassifolia* (cedar elm), *Platanus occidentalis* (American sycamore), *Fraxinus pennsylvanica* (green ash), *Quercus macrocarpa* (bur oak), *Populus deltoides* (eastern cottonwood), *Salix nigra* (black willow), and *Juglans nigra* (black walnut). Woody vines including species such as *Smilax bona-nox* (saw greenbrier), *Parthenocissus quinquefolia* (Virginia creeper), *Vitis* spp. (grapes), and *Toxicodendron radicans* (poison ivy) may be conspicuous. An herbaceous understory may be present, though sometimes patchy. Species in this layer may include *Elymus canadensis* (Canada wildrye), *Chasmanthium latifolium* (Indian woodoats), *Equisetum hyemale* (scouringrush horsetail), *Verbesina virginica* (white crownbeard), and *Ambrosia trifida* (giant ragweed). Shrubland within the system may be young regeneration with saplings of the overstory species of the surrounding forest and woodland, or may contain shrub species such as *Amorpha fruticosa* (false indigo bush), *Cephalanthus occidentalis* (common buttonbush), *Cornus drummondii* (roughleaf dogwood), *Ilex decidua* (possumhaw), and *Sideroxylon lanuginosum* (gum bumelia). These and other shrub species may occur as a patchy layer within the forest as well.

VEGETATION TYPES:

Southeastern Great Plains: Bottomland Barrens (1800)

Southeastern Great Plains Floodplain Sparse Vegetation
Identifier: CES203.710.0 **MoRAP Code:** 1800
Description: This type represents the gravel, mud, or sand bars and flats and other areas with sparse vegetation.

Southeastern Great Plains: Bottomland Mixed Evergreen – Hardwood Forest (1803)

Southeastern Great Plains Floodplain Mixed Hardwood – Evergreen Forest
Identifier: CES203.710.3 **MoRAP Code:** 1803
Description: Forests in the bottomlands co-dominated by hardwood species as described for the system and *Juniperus virginiana* (eastern redcedar). Some occurrences in the far eastern edge of the system may contain *Pinus taeda* (loblolly pine).

Southeastern Great Plains: Bottomland Hardwood Forest (1804)

Southeastern Great Plains Floodplain Hardwood Forest

Identifier: CES203.710.4 **MoRAP Code:** 1804
Description: This is the most commonly encountered type of the system. Bottomland forest dominated by species such as *Carya illinoinensis* (pecan), *Ulmus rubra* (slippery elm), *Celtis laevigata* (sugar hackberry), *Acer negundo* (boxelder), *Ulmus crassifolia* (cedar elm), *Platanus occidentalis* (American sycamore), *Fraxinus pennsylvanica* (green ash), *Quercus macrocarpa* (bur oak), *Populus deltoides* (eastern cottonwood), *Salix nigra* (black willow), and *Juglans nigra* (black walnut).

Southeastern Great Plains: Bottomland Shrubland and Young Woodland (1806)

Southeastern Great Plains Floodplain Shrubland and Young Woodland
Identifier: CES203.710.6 **MoRAP Code:** 1806
Description: This type may represent regenerating forest and so may be dominated by sapling of the hardwood forest type. Or, occurrences may represent shrublands dominated by species such as *Amorpha fruticosa* (false indigo bush), *Cephalanthus occidentalis* (common buttonbush), *Cornus drummondii* (roughleaf dogwood), *Ilex decidua* (possumhaw), and *Sideroxylon lanuginosum* (gum bumelia).

Southeastern Great Plains: Bottomland Eastern Redcedar Woodland and Shrubland (1815)

Southeastern Great Plains Floodplain Evergreen Woodland and Shrubland
Identifier: CES203.710.15 **MoRAP Code:** 1815
Description: Woodlands of the floodplain dominated by *Juniperus virginiana* (eastern redcedar).

Southeastern Great Plains: Bottomland Herbaceous Wetland (1817)

Southeastern Great Plains Floodplain Herbaceous Wetland
Identifier: CES203.710.17 **MoRAP Code:** 1817
Description: Herbaceous wetlands within the floodplain typically dominated by species such as *Typha* spp. (cattails), *Schoenoplectus* (bulrushes), *Juncus* spp., *Carex* spp. (sedges), and *Polygonum* spp. (smartweeds).

Southeastern Great Plains Riparian Forest

Identifier: CES205.709

Geology: This system occurs over various geologic strata, primarily sandstones and shales.
Landform: Small streams and drainages in situations dominated by erosional processes where broad alluvial deposits are generally lacking.
Soils: Various soil types are occupied by this system where drainages form within the surrounding upland matrix.

Description: This system occurs along small and intermittent streams where erosion rather than alluvial deposition is the dominant process. It occurs primarily as hardwood forest dominated by overstory species such as *Carya illinoinensis* (pecan), *Ulmus rubra* (slippery elm), *Celtis laevigata* (sugar hackberry), and *Fraxinus pennsylvanica* (green ash). Shrub cover may be high and include saplings of the overstory species or species such as *Cornus drummondii* (roughleaf

dogwood), *Sideroxylon lanuginosum* (gum bumelia), *Symphoricarpos orbiculatus* (coralberry), *Ulmus alata* (winged elm), and *Ilex decidua* (possumhaw). Sites lacking an overstory, or with a sparse overstory and substantial cover in the shrub layer, generally represent young forests with sapling of the overstory of the surrounding woodland or forest. The herbaceous layer may contain species such as *Elymus canadensis* (Canada wildrye), *Chasmanthium latifolium* (Indian woodoats), *Bothriochloa laguroides* ssp. *torreyana* (silver bluestem), *Schizachyrium scoparium* (little bluestem), *Equisetum hyemale* (scouringrush horsetail), and *Xanthium strumarium* (rough cocklebur). Non-native species such as *Cynodon dactylon* (Bermudagrass) and *Bromus arvensis* (Japanese brome) may dominate. Vines such as *Smilax bona-nox* (saw greenbrier), *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (poison ivy), and *Vitis cinerea* (graybark grape) may be conspicuous.

VEGETATION TYPES:

Southeastern Great Plains: Riparian Barrens (1900)

Southeastern Great Plains Riparian Barrens
Identifier: CES205.709.0 **MoRAP Code:** 1900
Description: Sparsely vegetated occurrences that may represent sand, silt, or gravel bars and flats within the riparian corridor.

Southeastern Great Plains: Riparian Mixed Evergreen – Hardwood Woodland (1903)

Southeastern Great Plains Riparian Mixed Evergreen – Hardwood Woodland
Identifier: CES205.709.3 **MoRAP Code:** 1903
Description: This type contains a mixture of hardwood species as described in the system description, as well as evergreen species such as *Juniperus virginiana* (eastern redcedar) or, in the vicinity of the Arbuckle Mountains, *Juniperus ashei* (Ashe juniper).

Southeastern Great Plains: Riparian Hardwood Woodland (1904)

Southeastern Great Plains Riparian Hardwood Woodland
Identifier: CES205.709.4 **MoRAP Code:** 1904
Description: This is the most frequently encountered type within the system with the overstory dominated by species such as *Carya illinoinensis* (pecan), *Ulmus rubra* (slippery elm), *Celtis laevigata* (sugar hackberry), and *Fraxinus pennsylvanica* (green ash).

Southeastern Great Plains: Riparian Shrubland and Young Woodland (1906)

Southeastern Great Plains Riparian Shrubland and Young Woodland
Identifier: CES205.709.6 **MoRAP Code:** 1906
Description: Occurrences often represent young regrowth of the woodland type and lack a significant overstory canopy cover. The shrub layer may be dominated by saplings of the overstory of the surrounding woodlands or may be dominated by shrubby species such as *Cornus drummondii* (roughleaf dogwood), *Sideroxylon lanuginosum* (gum bumelia), *Symphoricarpos orbiculatus* (coralberry), *Ulmus alata* (winged elm), and *Ilex decidua* (possumhaw).

Southeastern Great Plains: Riparian Eastern Redcedar Woodland and Shrubland (1915)

Southeastern Great Plains Riparian Eastern Redcedar Woodland and Shrubland
Identifier: CES205.709.15 **MoRAP Code:** 1915
Description: This type often represents sites with prior disturbance and is dominated by *Juniperus virginiana* (eastern redcedar), or in the vicinity of the Arbuckle Mountains, *Juniperus ashei* (Ashe juniper). The type might present as shrubland if young, or woodland if more mature.

Southeastern Great Plains: Riparian Herbaceous Wetland (1917)

Southeastern Great Plains Riparian Herbaceous Wetland
Identifier: CES205.709.17 **MoRAP Code:** 1917
Description: Areas of emergent marsh within the riparian corridor which may be dominated by species such as *Typha* spp. (cattails), *Schoenoplectus* spp. (bulrushes), *Carex* spp. (sedges), *Juncus* spp. (rushes), and *Polygonum* spp. (smartweeds).

Sparsely Vegetated

Central Interior Highlands Dry Acidic Glade and Barrens (Not Mapped)
Identifier: CES202.692

Description: This system is primarily found within the Ozark and Ouachita regions in Oklahoma, such as in the vicinity of Potato Hills. It often occurs over sandstone or chert, with well- to excessively well-drained, shallow soils interspersed with rock and boulders. Not all examples are acidic; sometimes a layer of neutral shale is present. These sites are typically droughty or seasonally moist with species such as *Schizachyrium scoparium* (little bluestem) and *Sorghastrum nutans* (yellow Indiangrass) dominant, with stunted oaks such as *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak) and *Vaccinium* spp. (blueberries) present.

Central Interior Highlands Calcareous Glade and Barrens (Not Mapped)
Identifier: CES202.691

Description: This system is found primarily in the Ozark and Ouachita region of Oklahoma, with some occurrences on Cretaceous limestone formations in the adjacent West Gulf Coastal Plain. Limestones and/or dolomite bedrock typify this system with shallow, moderately to well-drained soils interspersed with rocks. These sites are sometimes dominated by *Schizachyrium scoparium* (little bluestem), with *Andropogon gerardii* (big bluestem), *Bouteloua curtipendula* (sideoats grama), and calcium-loving plant species commonly associated. *Juniperus virginiana* (eastern redcedar) may be a conspicuous woody plant on portions of the glade with greater soil development or where cracks in the limestone allow deep rooting. Large examples are notable in Cherokee County, Oklahoma. Species such as *Lesquerella angustifolia* (threadleaf bladderpod) and *Leavenworthia aurea* (golden gladecress) may sometimes be present.

Ouachita Novaculite Glade and Woodland (Not Mapped)
Identifier: CES202.314

Description: In Oklahoma, this system occurs in southern Latimer, northern Pushmataha, and McCurtain Counties in the Ouachita Mountains, though many sites have been impacted by quarries. Occurrences along the Glover River are particularly notable. It represents a mosaic of glades and woodlands on exposures of Arkansas Novaculite, a weakly metamorphosed rock of sedimentary origin that is primarily composed of microcrystalline quartz and chalcedony. Occurrences are a mosaic of woodlands scattered on ridges and upper slopes with outcrops and patches of talus scattered throughout. Grassy openings occur on shallow soils with exposed bedrock, while woodlands occur on somewhat deeper soils. In all cases, these are fairly extreme growing conditions due to droughty, rocky soils. Species such as *Quercus stellata* (post oak), *Ulmus alata* (winged elm), *Quercus marilandica* (blackjack oak), *Juniperus virginiana* (eastern

redcedar), and *Carya texana* (black hickory) may be canopy dominants. Other woody species that may be present include *Toxicodendron radicans* (poison ivy), *Ribes cynosbati* (eastern prickly gooseberry), *Ribes curvatum* (granite gooseberry), *Parthenocissus quinquefolia* (Virginia creeper), *Ptelea trifoliata* (common hoptree), and *Ostrya virginiana* (hophornbeam). Herbaceous species may include *Schizachyrium scoparium* (little bluestem), *Sporobolus clandestinus* (rough dropseed), *Dichanthelium oligosanthes* (Heller's rosette grass), *Ageratina altissima* (white snakeroot), and *Lespedeza virginica* (slender lespedeza).

Ouachita Shale Glade and Barrens (Not Mapped)
Identifier: CES202.343

Description: This system is found in scattered locations in the Ouachita Mountains of Oklahoma. It occurs on gently sloping to steep south and west facing slopes and in broad, flat and gently sloping drainages where shale bedrock outcrops comes near to the surface of the ground. It is characterized by treeless, open glades which grade into open woodlands along gradients of soil depth and moisture. Vegetation in these barrens is highly heterogeneous and ranges from xeric patches of exposed bedrock with sparse vascular plant cover, to rich mucky seepage meadows, to prairie-like grasslands, to shrub thickets, to open woodlands over a small area.

Central Interior Calcareous Cliff and Talus (Not Mapped)
Identifier: CES202.690

Description: In Oklahoma, this system is found primarily in the Ozarks and Ouachitas and occupies limestone or dolomite outcrops and talus. Examples range from moist to dry, and from sparsely to moderately well-vegetated. Understory species can range from grassland species such as *Andropogon gerardii* (big bluestem) on drier slopes, to more mesic species in areas with higher moisture. Some occurrences constitute rocky opening in forest stands with moisture present from groundwater seepage. This system includes wet and dry cliffs. Herbaceous species common to the wetter examples may include *Adiantum capillus-veneris* (common maidenhair), *Aquilegia canadensis* (red columbine), *Asplenium rhizophyllum* (walking fern), *Boehmeria cylindrica* (smallspike false nettle), *Cystopteris bulbifera* (bulblet bladderfern), *Dichanthelium depauperatum* (starved panicgrass), *Heuchera americana* (American alumroot), *Impatiens pallida* (pale touch-me-not), *Lobelia siphilitica* (great blue lobelia), and *Woodsia obtusa* (blutlobe cliff fern).

Agricultural and Other Human-related Mapped Types

Pine Plantation - 1 - 3 meters (9305)
MoRAP Code: 9305

Description: Young, planted *Pinus taeda* (loblolly pine) or *Pinus echinata* (shortleaf pine) stands are most common within this type. Some sites mapped as this type contain sparse or short *Juniperus virginiana* (eastern redcedar). These evergreens may be interspersed with various hardwood species including *Quercus stellata* (post oak), *Ulmus alata* (winged elm), and *Quercus marilandica* (blackjack oak).

Pine Plantation (9301)

MoRAP Code: 9301
Description: Dense stands of *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine), or mixture of the two species characterize this type, although the coniferous evergreen aspect of the type may result from cover of *Juniperus virginiana* (eastern redcedar). Important components may include *Carya tomentosa* (bitternut hickory), *Liquidambar styraciflua* (sweetgum), *Quercus nigra* (water oak), *Quercus stellata* (post oak), and *Quercus alba* (white oak).

Row Crops (9307)

MoRAP Code: 9307
Description: This type includes all cropland where fields are fallow for some portion of the year. Some fields may rotate into and out of cultivation frequently, and year-round cover crops are generally mapped as grassland.

Urban High Intensity (9410)

MoRAP Code: 9410
Description: This type consists of built-up areas and wide transportation corridors that are dominated by impervious cover.

Urban Low Intensity (9411)

MoRAP Code: 9411
Description: This type includes areas that are built-up but not entirely covered by impervious cover, and includes most of the non-industrial areas within cities and towns, and selected roads.

Quarry (9412)

MoRAP Code: 9412
Description: Areas quarried for minerals with significant bare ground and showing signs of recent activity.

Disturbed Soil Pasture (9327)

MoRAP Code: 9327
Description: This type represents herbaceous vegetation usually dominated by non-native or weedy species such as *Cynodon dactylon* (Bermudagrass), *Bromus arvensis* (Japanese brome), *Solanum elaeagnifolium* (silverleaf nightshade), *Ambrosia* spp. (ragweeds), and *Helenium amarum* (sneezeweed). This type is known to occur on disturbed soils such as on slickspots, pits, and urban sites.

Ruderal Mixed Deciduous – Eastern Redcedar Woodland (9103)

MoRAP Code: 9103

Description: This type often represents a disturbance type co-dominated by *Juniperus virginiana* (eastern redcedar) and hardwood species such as *Celtis laevigata* (sugar hackberry), *Sapindus saponaria* var. *drummondii* (western soapberry), *Ulmus pumila* (Siberian elm), and *Robinia pseudoacacia* (black locust).

Ruderal Deciduous Woodland (9104)

MoRAP Code: 9104
Description: This type generally occurs on soils and sites where grasslands are typically expected. They are dominated by species such as *Celtis laevigata* (sugar hackberry), *Gleditsia triacanthos* (honey locust), *Maclura pomifera* (Osage orange), *Ulmus alata* (winged elm), *Ulmus pumila* (Siberian elm), *Robinia pseudoacacia* (black locust), *Diospyros virginiana* (common persimmon), and *Catalpa speciosa* (northern catalpa). These woodlands may also have a composition resembling riparian or bottomland woodlands, with species such as *Fraxinus pennsylvanica* (green ash), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Salix nigra* (black hickory), *Sapindus saponaria* var. *drummondii* (western soapberry), and *Populus deltoides* (eastern cottonwood).

Ruderal Mesquite Shrubland (9106)

MoRAP Code: 9106
Description: This type is dominated by *Prosopis glandulosa* (honey mesquite) occupying sites that might more typically support **Central Mixedgrass Prairie (CES303.659).** These shrublands typically have the canopy overwhelmingly dominated by *Prosopis glandulosa* (honey mesquite) and appear to be in situations where previous agricultural production has occurred. *Opuntia* spp. (pricklypears) and *Cylindropuntia* spp. (chollas) may be common in the understory and herbaceous species such as *Bromus tectorum* (cheatgrass), *Bromus arvensis* (Japanese brome), *Amphiachyris dracunculoides* (prairie broomweed), and *Ambrosia psilostachya* (western ragweed) are often conspicuous.

Ruderal Eastern Redcedar Woodland and Shrubland (9115)

MoRAP Code: 9115
Description: This type may represent woodlands or shrublands where the canopy is dominated by *Juniperus virginiana* (eastern redcedar). In limited areas, the coniferous evergreen canopy dominant may be *Juniperus ashei* (Ashe juniper), *Juniperus pinchotii* (redberry juniper), *Pinus taeda* (loblolly pine), or *Pinus echinata* (shortleaf pine). Other species in the canopy may include species such as *Quercus stellata* (post oak), *Ulmus pumila* (Siberian elm), and *Celtis laevigata* (sugar hackberry). *Juniperus* spp. (junipers) may dominate the overstory canopy in woodlands, or the shrub layer cover woodlands or shrublands.

Ruderal Plains Shrubland (9196)

MoRAP Code: 9196
Description: This type is a shrubland more typical of the High Plains and may occur on somewhat sandy sites, overgrazed grasslands, or the edges of **Western Great Plains Shortgrass Prairie (CES303.672)**. Typical dominants include *Artemisia filifolia* (sand sagebrush), *Yucca glauca* (soapweed yucca), *Cylindropuntia imbricata* (tree cholla), *Artemisia ludoviciana* (white sagebrush), and *Gutierrezia sarothrae* (broom snakeweed).

Ruderal Deciduous Shrubland and Young Woodland (9206)

MoRAP Code: 9206
Description: This type typically represents shrublands and young woodlands on soil types that more usually support grasslands. Shrublands may be dominated by species such *Rhus copallinum* (winged sumac), *Rhus glabra* (smooth sumac), *Cornus drummondii* (roughleaf dogwood), *Prunus angustifolia* (Chickasaw plum), *Artemisia filifolia* (sand sagebrush), and *Ligustrum sinense* (Chinese privet). Young woodlands may be dominated by saplings or a sparse overstory of species such as *Gleditsia triacanthos* (honey locust), *Celtis laevigata* (sugar hackberry), *Ulmus alata* (winged elm), *Robinia pseudoacacia* (black locust), *Maclura pomifera* (Osage orange), *Ulmus pumila* (Siberian elm), *Ulmus americana* (American elm), *Sapindus saponaria* var. *drummondii* (western soapberry), *Quercus stellata* (post oak), and *Catalpa speciosa* (northern catalpa).

Ozark-Ouachita: Pasture/Prairie (9117)

MoRAP Code: 9117
Description: These grassland patches are primarily managed pasture within more typically woodland landscapes. Dominant herbaceous species include *Cynodon dactylon* (Bermudagrass), *Schedonorus arundinaceus* (tall fescue), *Bromus arvensis* (Japanese brome), *Tridens flavus* (purpletop tridens), *Schizachyrium scoparium* (little bluestem), *Ambrosia artemisiifolia* (annual ragweed), *Helenium amarum* (sneezeweed), and *Lespedeza cuneata* (sericea lespedeza).

West Gulf Coastal Plain: Pasture (9197)

MoRAP Code: 9197
Description: These are primarily managed pastures within a woodland and forest landscape. Dominant herbaceous species include *Cynodon dactylon* (Bermudagrass), *Schizachyrium scoparium* (little bluestem), *Tridens flavus* (purpletop tridens), *Paspalum dilatatum* (dallisgrass), *Schedonorus arundinaceus* (tall fescue), *Croton monanthogynus* (prairie tea), *Iva annua* (annual marsh elder), and *Helenium amarum* (sneezeweed).

Planted Non-native and/or Native Grasses (9337)

MoRAP Code: 9337
Description: Grasslands or pasture typically planted with native grasses such as *Bouteloua curtipendula* (sideoats grama) or *Schizachyrium scoparium* (little bluestem). Non-native grasses such as *Bothriochloa ischaemum* spp. *songarica* (yellow bluestem) or *Eragrostis curvula* (weeping lovegrass) may be dominant or present.

Mainly Natural Azonal Mapped Types

Barren (9000)

MoRAP Code: 9000
Description: This type includes areas where little or no vegetative cover existed at the time of image data collection. Large areas cleared for development are included, as well as rural roads

and buildings and associated clearing in primarily rural areas. Stream beds with exposed gravel or bedrock, rock outcrops, quarries, and mines may be mapped as this type. Fallow fields or areas within cropland blocks that remain barren throughout one growing season or heavily grazed pastures where bare soils are dominant may also be mapped as barren.

Open Water (9600)

MoRAP Code: 9600
Description: In addition to large lakes and rivers, ephemeral ponds may be mapped as open water. Some mapped areas may support vegetation with pioneering species such as *Salix nigra* (black willow), *Populus deltoides* (eastern cottonwood), *Juncus* spp. (rushes), sedges, *Typha* spp. (cattails), and *Eleocharis* spp. (spikerushes).

Literature Cited

Hoagland, B. 2000. The vegetation of Oklahoma: a classification for landscape mapping and conservation planning. Southwestern Naturalist 45(4):385-420.

Notes:

Systems not currently attributed to Oklahoma, but which were mapped:

Edwards Plateau Dry-Mesic Slope Forest and Woodland (CES303.656)
Edwards Plateau Limestone Shrubland (CES303.041)
Rocky Mountain Gambel Oak – Mixed Montane Shrubland (CES306.818)
South-Central Interior Small Stream and Riparian (CES202.706)
West Gulf Coastal Plain Pine – Hardwood Forest (CES203.378)
West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland (CES203.056)
Western Great Plains Riparian (CES303.956)

Systems not currently attributed to Oklahoma and not mapped, but believed to occur:

Western Great Plains Foothill and Piedmont Grassland (CES303.817)
West Gulf Coastal Plain Herbaceous Seep and Bog (CES203.194)
West Gulf Coastal Plain Mesic Hardwood Forest (CES203.280)

Systems considered for inclusion, but excluded from the legend. NatureServe currently attributes to OK:

Interior Highlands Forested Acidic Seep (CES202.321)
Western Great Plains Cliff and Outcrop (CES303.665)
Ozark Prairie and Woodland (CES202.326) –May have been excluded due to vague description or ineffective unit to include in legend.
Great Plains Wooded Draw and Ravine (CES303.680) – This system may in fact be correctly attributed to Oklahoma, but not treated here.

Systems considered for inclusion, but excluded from the legend:

West Gulf Coastal Plain Pine – Hardwood Flatwoods (CES203.278)
Interior Highlands Unglaciated Flatwoods (CES202.454)
Red River Large Floodplain Forest (CES203.065)

Other notes:

Ouachita Talus Slope – Sparsely vegetated on sandstone “rock glaciers”. May be as large as 20 acres. Possibly a new system. No attempt was made to map these.

Previously undescribed systems:

Wichita Mountains Woodlands
Pleistocene Sands Blackjack Oak Woodland